(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
21 May 2004 (21.05.2004)

PCT

(10) International Publication Number
WO 2004/041193 A2

(51) International Patent Classification[7]: A61K

(21) International Application Number: PCT/US2003/034681

(22) International Filing Date: 31 October 2003 (31.10.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/423,545	1 November 2002 (01.11.2002)	US
60/449,945	25 February 2003 (25.02.2003)	US
60/477,111	9 June 2003 (09.06.2003)	US

(71) Applicant *(for all designated States except US)*: **DECODE GENETICS EHF.** [IS/IS]; Sturlugotu 8, IS-101 Reykjavik (IS).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **REYNISDOTTIR, Inga** [IS/IS]; Gunnarsbraut 26 1R, IS-105 Reykjavik (IS). **GULCHER, Jeffrey, R.** [US/US]; 130 South Canal Street, #9M, Chicago, IL 60606 (US). **GRANT, Struan, F.** [GB/IS]; Sorlajkov 1, IS-107 Reykjavik (IS). **THORLEIFSSON, Gudmar** [IS/IS]; Vesturberg 10, IS-111 Reykjavik (IS).

(74) Agents: **CARROLL, Alice, O.** et al.; Hamilton, Brook, Smith & Reynolds, P.C., 530 Virginia Road, P.O. Box 9133, Concord, MA 01742-9133 (US).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(regional)*: ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 2004/041193 A2

(54) **Title:** HUMAN TYPE II DIABETES GENE-Kv CHANNEL-INTERACTING PROTEIN (KChIP1) LOCATED ON CHROMOSOME 5

(57) **Abstract:** Association of Type II diabetes and a locus on chromosome 5 is disclosed. In particular, the gene KCh1P 1 within this locus is shown by linkage analysis to be a susceptibility gene for Type II diabetes. Pathway targeting for drug delivery and diagnosis applications in identifying those who have Type II diabetes or are at risk of developing Type II diabetes, in particular those that are non-obese are described.

B1

HUMAN TYPE II DIABETES GENE – Kv CHANNEL-INTERACTING PROTEIN (KChIP1) LOCATED ON CHROMOSOME 5

RELATED APPLICATIONS

This application claims priority to U.S. Provisional Application NO. 60/477,111 filed June 9, 2003, and to U.S. Provisional Application NO. 60/449,945, filed on February 25, 2003, and also to U.S. Provisional Application NO. 60/423,545, filed on November 1, 2002, the entire contents of all applications are incorporated herein by reference.

BACKGROUND OF THE INVENTION

Diabetes mellitus, a metabolic disease in which carbohydrate utilization is reduced and lipid and protein utilization is enhanced, is caused by an absolute or relative deficiency of insulin. In the more severe cases, diabetes is characterized by chronic hyperglycemia, glycosuria, water and electrolyte loss, ketoacidosis and coma. Long term complications include development of neuropathy, retinopathy, nephropathy, generalized degenerative changes in large and small blood vessels and increased susceptibility to infection. The most common form of diabetes is Type II, non-insulin-dependent diabetes that is characterized by hyperglycemia due to impaired insulin secretion and insulin resistance in target tissues. Both genetic and environmental factors contribute to the disease. For example, obesity plays a major role in the development of the disease. Type II diabetes is often a mild form of diabetes mellitus of gradual onset.

The health implications of Type II diabetes are enormous. In 1995, there were 135 million adults with diabetes worldwide. It is estimated that close to 300 million will have diabetes in the year 2025. (King H., *et al.*, *Diabetes Care,* 21(9): 1414-1431 (1998)). The prevalence of Type II diabetes in the adult population in Iceland is 2.5% (Vilbergsson, S., *et al.*, *Diabet. Med.*, 14(6): 491-498 (1997)), which comprises approximately 5,000 people over the age of 34 who have the disease. The high prevalence of the disease and increasing population affected shows an unmet medical need to define the genetic factors involved in Type II diabetes to more precisely define the associated risk factors. Also needed are therapeutic agents for prevention of Type II diabetes.

SUMMARY OF THE INVENTION

As described herein, a locus on chromosome 5q35 has been demonstrated which plays a major role in Type II diabetes. The locus, referred to as the Type II diabetes locus, comprises a nucleic acid that encodes, KChIP1.

The present invention relates to genes located within the Type II diabetes - related locus, particularly nucleic acids comprising the KChIP1 gene, and the amino acids encoded by these nucleic acids. The invention further relates to pathway targeting for drug delivery and diagnosis in identifying those who have Type II diabetes and those at risk of developing Type II diabetes. Also described are haplotypes and SNPs that can be used to identify individuals with Type II diabetes or at risk of developing Type II diabetes, particularly in those that are non-obese. As a consequence, intervention can be prescribed to these individuals before symptoms of the disease present, *e.g.*, dietary changes, exercise and/or medication. Identification of genes in the Type II diabetes locus can pave the way for a better understanding of the disease process, which in turn can lead to improved diagnostics and therapeutics.

The present invention pertains to methods of diagnosing a susceptibility to Type II diabetes in an individual, comprising detecting a polymorphism in a KChIP1 nucleic acid, wherein the presence of the polymorphism in the nucleic acid is indicative of a susceptibility to Type II diabetes. The invention additionally pertains to methods of diagnosing Type II diabetes in an individual, comprising detecting a polymorphism in a KChIP1 nucleic acid, wherein the presence of the polymorphism in the nucleic acid is indicative of Type II diabetes. In one embodiment, in diagnosing Type II diabetes or susceptibility to Type II diabetes by detecting the presence of a polymorphism in a KChIP1 nucleic acid, the presence of the polymorphism in the KChIP1 nucleic acid can be indicated, for example, by the presence of one or more of the polymorphisms indicated in Table 10.

In other embodiments, the invention relates to methods of diagnosing a susceptibility to Type II diabetes in an individual, comprising detecting an alteration in the expression or composition of a polypeptide encoded by a KChIP1 nucleic acid in a test sample, in comparison with the expression or composition of a polypeptide encoded by a KChIP1 nucleic acid in a control sample, wherein the presence of an

alteration in expression or composition of the polypeptide in the test sample is indicative of a susceptibility to Type II diabetes. The invention additionally relates to a method of diagnosing Type II diabetes in an individual, comprising detecting an alteration in the expression or composition of a polypeptide encoded by a KChIP1 nucleic acid in a test sample, in comparison with the expression or composition of a polypeptide encoded by KChIP1 nucleic acid in a control sample, wherein the presence of an alteration in expression or composition of the polypeptide in the test sample is indicative of Type II diabetes.

The invention also relates to an isolated nucleic acid molecule comprising a KChIP1 nucleic acid (*e.g.*, SEQ ID NO: 1 or the complement of SEQ ID NO:1). In certain embodiments, the KChIP1 nucleic acid comprises one or more nucleotide sequence(s) selected from the group of nucleic acid sequences as shown in Table 10 (*e.g.*, SEQ ID NOs: 114-258) and the complements of the group of nucleic acid sequences as shown in Table 10. For example, in certain embodiments, the nucleotide sequence contains one or more polymorphism(s), such as those shown in Table 10. In another embodiment, the invention relates to an isolated nucleic acid molecule which hybridizes under high stringency conditions to a nucleotide sequence selected from the group of SEQ ID NO: 1 and the complement of SEQ ID NO: 1. In certain embodiments, the isolated nucleic acid molecule hybridizes under high stringency conditions to a nucleotide sequence comprising one or more nucleotide sequence(s) selected from the group of nucleic acid sequences as shown in Table 10 (*e.g.*, SEQ ID NOs: 114-258) and the complements of the group of nucleic acid sequences as shown in Table 10. For example, in certain embodiments, the nucleotide sequence contains one or more polymorphism(s), such as those shown in Table 10.

Also contemplated by the invention is a method of assaying for the presence of a first nucleic acid molecule in a sample, comprising contacting said sample with a second nucleic acid molecule, where the second nucleic acid molecule comprises at least one (or more) nucleic acid sequence(s) selected from the group of SEQ ID NOs: 1 and 114-258, inclusive, wherein the nucleic acid sequence hybridizes to the first nucleic acid under high stringency conditions. In certain embodiments, the second

nucleic acid molecule contains one or more polymorphism(s), such as those shown in Table 10.

The invention also relates to a vector comprising an isolated nucleic acid molecule of the invention (*e.g.*, SEQ ID NOs: 1 and 114-258; optionally including one or more of the polymorphisms shown in Table 10) operably linked to a regulatory sequence, as well as to a recombinant host cell comprising the vector. The invention also provides a method for producing a polypeptide encoded by an isolated nucleic acid molecule having a polymorphism, comprising culturing the recombinant host cell under conditions suitable for expression of the nucleic acid molecule.

Also contemplated by the invention is a method of assaying for the presence of a polypeptide encoded by an isolated nucleic acid molecule of the invention in a sample, the method comprising contacting the sample with an antibody that specifically binds to the encoded polypeptide.

The invention further pertains to a method of identifying an agent that alters expression of a KChIP1 nucleic acid, comprising: contacting a solution containing a nucleic acid comprising the promoter region of the KChIP1 gene operably linked to a reporter gene, with an agent to be tested; assessing the level of expression of the reporter gene in the presence of the agent; and comparing the level of expression of the reporter gene in the presence of the agent with a level of expression of the reporter gene in the absence of the agent; wherein if the level of expression of the reporter gene in the presence of the agent differs, by an amount that is statistically significant, from the level of expression in the absence of the agent, then the agent is an agent that alters expression of the KChIP1 gene or nucleic acid. An agent identified by this method is also contemplated.

The invention additionally comprises a method of identifying an agent that alters expression of a KChIP1 nucleic acid, comprising contacting a solution containing a nucleic acid of the invention or a derivative or fragment thereof, with an agent to be tested; comparing expression of the nucleic acid, derivative or fragment in the presence of the agent with expression of the nucleic acid, derivative or fragment in the absence of the agent; wherein if expression of the nucleic acid, derivative or fragment in the presence of the agent differs, by an amount that is statistically

significant, from the expression in the absence of the agent, then the agent is an agent that alters expression of the KChIP1 nucleic acid. In certain embodiments, the expression of the nucleic acid, derivative or fragment in the presence of the agent comprises expression of one or more splicing variants(s) that differ in kind or in quantity from the expression of one or more splicing variant(s) the absence of the agent. Agents identified by this method are also contemplated.

Representative agents that alter expression of a KChIP1 nucleic acid contemplated by the invention include, for example, antisense nucleic acids to a KChIP1 gene or nucleic acid; a KChIP1 gene or nucleic acid; a KChIP1 polypeptide; a KChIP1 gene or nucleic acid receptor, or other receptor; a KChIP1 binding agent; a peptidomimetic; a fusion protein; a prodrug thereof; an antibody; and a ribozyme. A method of altering expression of a KChIP1 nucleic acid, comprising contacting a cell containing a nucleic acid with such an agent is also contemplated.

The invention further pertains to a method of identifying a polypeptide which interacts with a KChIP1 polypeptide (*e.g.*, a KChIP1 polypeptide encoded by a nucleic acid of the invention, such as a nucleic acid comprising one or more polymorphism(s) indicated in Table 10), comprising employing a yeast two-hybrid system using a first vector which comprises a nucleic acid encoding a DNA binding domain and a KChIP1 polypeptide, splicing variant, or a fragment or derivative thereof, and a second vector which comprises a nucleic acid encoding a transcription activation domain and a nucleic acid encoding a test polypeptide. If transcriptional activation occurs in the yeast two-hybrid system, the test polypeptide is a polypeptide, which interacts with a KChIP1 polypeptide.

In certain methods of the invention, a Type II diabetes therapeutic agent is used. The Type II diabetes therapeutic agent can be an agent that alters (*e.g.*, enhances or inhibits) KChIP1 polypeptide activity and/or KChIP1 nucleic acid expression, as described herein (*e.g.*, a nucleic acid agonist or antagonist).

Type II diabetes therapeutic agents can alter polypeptide activity or nucleic acid expression of a KChIP1 nucleic acid by a variety of means, such as, for example, by providing additional polypeptide or upregulating the transcription or translation of the nucleic acid encoding the KChIP1 polypeptide; by altering posttranslational

processing of the KChIP1 polypeptide; by altering transcription of splicing variants; or by interfering with polypeptide activity (*e.g.*, by binding to the KChIP1 polypeptide, or by binding to another polypeptide that interacts with KChIP1, such as a KChIP1 binding agent as described herein), by altering (*e.g.*, downregulating) the expression, transcription or translation of a nucleic acid encoding KChIP1; or by altering interaction among KChIP1 and a KChIP1 binding agent.

In a further embodiment, the invention relates to Type II diabetes therapeutic agent, such as an agent selected from the group consisting of: a KChIP1 nucleic acid or fragment or derivative thereof; a polypeptide encoded by a KChIP1 nucleic acid (*e.g.*, encoded by a KChIP1 nucleic acid having one or more polymorphism(s) such as those set forth in Table 10); a KChIP1 receptor; a KChIP1 binding agent; a peptidomimetic; a fusion protein; a prodrug; an antibody; an agent that alters KChIP1 gene or nucleic acid expression; an agent that alters activity of a polypeptide encoded by a KChIP1 gene or nucleic acid; an agent that alters posttranscriptional processing of a polypeptide encoded by a KChIP1 gene or nucleic acid; an agent that alters interaction of a KChIP1 polypeptide with a KChIP1 binding agent or receptor; an agent that alters transcription of splicing variants encoded by a KChIP1 gene or nucleic acid; and ribozymes. The invention also relates to pharmaceutical compositions comprising at least one Type II diabetes therapeutic agent as described herein.

The invention also pertains to a method of treating a disease or condition associated with a KChIP1 polypeptide (*e.g.*, Type II diabetes) in an individual, comprising administering a Type II diabetes therapeutic agent to the individual, in a therapeutically effective amount. In certain embodiments, the Type II diabetes therapeutic agent is a KChIP1 agonist; in other embodiments, the Type II diabetes therapeutic agent is a KChIP1 antagonist. The invention additionally pertains to use of a Type II diabetes therapeutic agent as described herein, for the manufacture of a medicament for use in the treatment of Type II diabetes, such as by the methods described herein.

A transgenic animal comprising a nucleic acid selected from the group consisting of: an exogenous KChIP1 gene or nucleic acid and a nucleic acid encoding a KChIP1 polypeptide, is further contemplated by the invention.

In yet another embodiment, the invention relates to a method for assaying a sample for the presence of a KChIP1 nucleic acid, comprising contacting the sample with a nucleic acid comprising a contiguous nucleotide sequence which is at least partially complementary to a part of the sequence of said KChIP1 nucleic acid under conditions appropriate for hybridization, and assessing whether hybridization has occurred between a KChIP1 nucleic acid and said nucleic acid comprising a contiguous nucleotide sequence which is at least partially complementary to a part of the sequence of said KChIP1 nucleic acid; wherein if hybridization has occurred, a KChIP1 nucleic acid is present in sample. In certain embodiments, the contiguous nucleotide sequence is completely complementary to a part of the sequence of said KChIP1 nucleic acid. If desired, amplification of at least part of said KChIP1 nucleic acid can be performed.

In certain other embodiments, the contiguous nucleotide sequence is 100 or fewer nucleotides in length and is either at least 80% identical to a contiguous sequence of nucleotides of one or more of SEQ ID NOs: 1 and 114-258; at least 80% identical to the complement of a contiguous sequence of nucleotides of one or more of SEQ ID NOs: 1 and 114-258; or capable of selectively hybridizing to said KChIP1 nucleic acid.

In other embodiments, the invention relates to a reagent for assaying a sample for the presence of a KChIP1 gene or nucleic acid, the reagent comprising a contiguous nucleotide sequence which is at least partially complementary to a part of the nucleic acid sequence of said KChIP1 gene or nucleic acid; or comprising a contiguous nucleotide sequence which is completely complementary to a part of the nucleic acid sequence of said KChIP1 gene or nucleic acid. Also contemplated by the invention is a reagent kit, *e.g.*, for assaying a sample for the presence of a KChIP1 nucleic acid, comprising (*e.g.*, in separate containers) one or more labeled nucleic acids comprising a contiguous nucleotide sequence which is at least partially complementary to a part of the nucleic acid sequence of the KChIP1 nucleic acid, and

reagents for detection of said label. In certain embodiments, the labeled nucleic acid comprises a contiguous nucleotide sequence that is completely complementary to a part of the nucleotide sequence of said KChIP1 gene or nucleic acid. In other embodiments, the labeled nucleic acid can comprise a contiguous nucleotide sequence which is at least partially complementary to a part of the nucleotide sequence of said KChIP1 gene or nucleic acid, and which is capable of acting as a primer for said KChIP1 nucleic acid when maintained under conditions for primer extension.

The invention also provides for the use of a nucleic acid which is 100 or fewer nucleotides in length and which is either: a) at least 80% identical to a contiguous sequence of nucleotides of one or more of SEQ ID NOs: 1 and 114-258; b) at least 80% identical to the complement of a contiguous sequence of nucleotides of one or more of SEQ ID NOs: 1 and 114-258; or c) capable of selectively hybridizing to said KChIP1 nucleic acid, for assaying a sample for the presence of a KChIP1 nucleic acid.

In yet another embodiment, the use of a first nucleic acid which is 100 or fewer nucleotides in length and which is either: a) at least 80% identical to a contiguous sequence of nucleotides of one or more of SEQ ID NOs: 1 and 114-258; b) at least 80% identical to the complement of a contiguous sequence of nucleotides of one or more of SEQ ID NOs: 1 and 114-258; or c) capable of selectively hybridizing to said KChIP1 nucleic acid; for assaying a sample for the presence of a KChIP1 gene or nucleic acid that has at least one nucleotide difference from the first nucleic acid (*e.g.*, a SNP as set forth in Table 10), such as for diagnosing a susceptibility to a disease or condition associated with a KChIP1.

The invention also relates to a method of diagnosing Type II diabetes or a susceptibility to Type II diabetes in an individual, comprising determining the presence or absence in the individual of certain "haplotypes" (combinations of genetic markers). In one aspect of the invention of diagnosising a susceptibility of the disease, methods are described comprising screening for one of the at-risk haplotypes in the KChIP1 gene that is more frequently present in an individual susceptible to Type II diabetes, compared to the frequency of its presence in the general population, wherein the presence of an at-risk haplotype is indicative of a susceptibility to Type II

diabetes. An "at-risk haplotype" is intended to embrace one or a combination of haplotypes described herein over the KChIP1 gene that show high correlation to Type II diabetes. In one embodiment, the at-risk haplotype is characterized by the presence of at least one single nucleotide polymorphisms as described in Table 13. In one embodiment, a haplotype associated with Type II diabetes or a susceptibility to Type II diabetes comprises one or more haplotypes identified in Table 2 (haplotypes identified as A1, A2, A3, A4, A5, A6, B1, B2, B3, B4 and B5) or Table 5 (haplotypes identified as D1, D2, D3, D4 and D5). In certain embodiments, a haplotype associated with Type II diabetes or a susceptibility to Type II diabetes comprises markers DG5S879, DG5S881, D5S2075, DG5S883 and DG5S38 at the 5q35 locus; or DG5S1058 and DG5S37 at the 5q35 locus; or DG5S1058, DG5S37 and DG5S101 at the 5q35 locus; or DG5S881, DG5S1058, D5S2075, DG5S883 and DG5S38 at the 5q35 locus; or DG5S879, DG5S1058 and DG5S37; or DG5S881, D5S2075, DG5S883 and DG5S38 at the 5q35 locus; DG5S953, DG5S955, DG5S13 and DG5S959 at the 5q35 locus; or DG5S888 and DG5S953 at the 5q35 locus; or DG5S953, DG5S955 and DG5S124 at the 5q35 locus; or DG5S888, DG5S44 and DG5S953 at the 5q35 locus; or DG5S953, DG5S955, DG5S13, DG5S123, and DG5S959 at the 5q35 locus. The presence of the haplotype is diagnostic of Type II diabetes or of a susceptibility to Type II diabetes. Also described herein is a haplotype associated with Type II diabetes or a susceptibility to Type II diabetes comprising markers DG5S13, KCP_1152, and D5S625 at the 5q35 locus; the presence of the haplotype is diagnostic of Type II diabetes or of a susceptibility to Type II diabetes. In one particular embodiment, the presence of the –4, 1, 0 haplotype at DG5S13, KCP_1152, and D5S625 is diagnostic of Type II diabetes or of a susceptibility to Type II diabetes. In another embodiment, a haplotype associated with Type II diabetes or a susceptibility to Type II diabetes in an individual, comprises markers DG5S124, KCP_1152, KCP_2649, KPC_4976 and KPC-16152 at the 5q35 locus. In one particular embodiment, the presence of the 0, 1, 1, 3 and 0 haplotype at DG5S124, KCP_1152, KCP_2649, KPC_4976 and KPC-16152 is diagnostic of Type II diabetes or of a susceptibility to Type II diabetes. In another embodiment, a haplotype associated with Type II diabetes or a susceptibility to Type

II diabetes in an individual, comprises markers KCP_173982, KCP_15400, and KCP_18069. In one particular embodiment, the presence of the 0, 1, 1 haplotype at KCP_173982, KCP_15400, and KCP_18069 is diagnostic of Type II diabetes or of a susceptibility to Type II diabetes.

In additional embodiments, a haplotype associated with Type II diabetes or a susceptibility to Type II diabetes comprises markers DG5S124, KCP_1152, KCP_2649, KCP_4976, and KCP_16152 at the 5q35 locus, as well as one of the following 3 markers: KCP_197678, KCP_197775, and KCP_202795 at the 5q35 locus; the presence of the haplotype is diagnostic of Type II diabetes or of a susceptibility to Type II diabetes. In particular embodiments, the presence of the 0, 3, 1, 1, 3, 0 haplotype at DG5S124, KCP_197679, KCP_1152, KCP_2649, KCP_4976, and KCP_16152; the presence of the 0, 3, 1, 1, 3, 0 haplotype at DG5S124, KCP_197775, KCP_1152, KCP_2649, KCP_4976, and KCP_16152; or the presence of the 0, 1, 1, 1, 3, 0 haplotype at DG5S124, KCP_202795, KCP_1152, KCP_2649, KCP_4976, and KCP_16152; is diagnostic of Type II diabetes or of a susceptibility to Type II diabetes.

The presence or absence of the haplotype can be determined by various methods, including, for example, using enzymatic amplification of nucleic acid from the individual, electrophoretic analysis, restriction fragment length polymorphism analysis and/or sequence analysis.

Also described herein is a method of diagnosing Type II diabetes in an individual, comprising determining the presence or absence in the individual of a haplotype comprising one or more markers and/or single nucleotide polymorphisms as shown in Table 10, Table 2, Table 5 and/or Table 13 in the locus on chromosome 5q35, wherein the presence of the haplotype is diagnostic of Type II diabetes. Also contemplated is a method of diagnosing a susceptibility to Type II diabetes in an individual, comprising determining the presence or absence in the individual of a haplotype comprising one or more markers and/or single nucleotide polymorphisms as shown in Table 10 and/or Table 13 in the locus on chromosome 5q35, wherein the presence of the haplotype is diagnostic of a susceptibility to Type II diabetes.

A method for the diagnosis and identification of a susceptibility to Type II diabetes in an individual is also described, comprising: screening for an at-risk haplotype in the KChIP1 nucleic acid that is more frequently present in an individual susceptible to Type II diabetes compared to an individual who is not susceptible to Type II diabetes, wherein the at-risk haplotype increases the risk significantly. In certain embodiments, the significant increase is at least about 20% or the significant increase is identified as an odds ratio of at least about 1.2.

A major application of the current invention involves prediction of those at higher risk of developing a Type II diabetes. Diagnostic tests that define genetic factors contributing to Type II diabetes might be used together with or independent of the known clinical risk factors to define an individual's risk relative to the general population. Better means for identifying those individuals at risk for Type II diabetes should lead to better prophylactic and treatment regimens, including more aggressive management of the current clinical risk factors.

Another application of the current invention is the specific identification of a rate-limiting pathway involved in Type II diabetes. A disease gene with genetic variation that is significantly more common in diabetic patients as compared to controls represents a specifically validated causative step in the pathogenesis of Type II diabetes. That is, the uncertainty about whether a gene is causative or simply reactive to the disease process is eliminated. The protein encoded by the disease gene defines a rate-limiting molecular pathway involved in the biological process of Type II diabetes predisposition. The proteins encoded by such Type II genes or its interacting proteins in its molecular pathway may represent drug targets that may be selectively modulated by small molecule, protein, antibody, or nucleic acid therapies. Such specific information is greatly needed since the population affected with Type II diabetes is growing.

A third application of the current invention is its use to predict an individual's response to a particular drug, even drugs that do not act on KChIP1 or its pathway. It is a well-known phenomenon that in general, patients do not respond equally to the same drug. Much of the differences in drug response to a given drug is thought to be based on genetic and protein differences among individuals in certain genes and their

corresponding pathways. Our invention defines the association of KChIP1 with Type II diabetes. Some current or future therapeutic agents may be able to affect this gene directly or indirectly and therefore, be effective in those patients whose Type II diabetes risk is in part determined by the KChIP1 genetic variation. On the other hand, those same drugs may be less effective or ineffective in those patients who do not have at risk variation in the KChIP1 gene. Therefore, KChIP1 variation or haplotypes may be used as a pharmacogenomic diagnostic to predict drug response and guide choice of therapeutic agent in a given individual.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects, features and advantages of the invention will be apparent from the following more particular description of preferred embodiments of the invention, as illustrated in the accompanying drawings.

FIG.1.1 through 1.148 show the KChIP1 genomic DNA (SEQ ID NO: 1). This sequence is taken from NCBI Build 33. The numbering in FIG. 1, as well as the "start" and "end" numbers in all Tables refer to the location in Chromosome 5 in NCBI Build 33. The numbering in FIG. 1 refers to the last base in the line immediately preceding the number; the numbers are in decreasing order because of the "reverse orientation" of the gene.

FIG. 2 shows the amino acid sequence of KChIP1 as published by An *et al. Nature,* 403(6768): 553-6 (2000) (SEQ ID NO: 2).

FIG. 3 shows the nucleic acid sequence (SEQ ID NO: 3) encoding the amino acid sequence of KChIP1 as published by An *et al*, *Nature,* 403(6768): 553-6 (2000) (SEQ ID NO: 2).

FIG. 4 is a series of graphs showing the results of a genome-wide scan using 906 microsatellite markers. Results are shown for three phenotypes: all Type II diabetics (solid lines), obese Type II diabetics (dotted lines) and non-obese Type II diabetics (dashed lines). The multipoint allele-sharing LOD-score is on the vertical axis, and the centimorgan distance from the P-terminus of the chromosome is on the horizontal axis.

FIG. 5 graphically depicts the multipoint allele-sharing LOD-score of the locus on chromosome 5 after 38 microsatellite markers have been added to the framework set in a 40-cM interval, from 160 cM to 200 cM. Results are shown for the same three phenotypes as in FIG. 4; all Type II diabetics (solid line), non-obese Type II diabetics(dashed line) and obese Type II diabetics (dotted line).the results of a genome-wide scan using 906 microsatellite markers.

FIG. 6 graphically depicts the single-marker and haplotype association within the 1-LOD-drop for 590 non-obese diabetics vs 477 unrelated population controls. The location of the markers and haplotypes is on the horizontal axis and the corresponding two-sided P-value on the vertical axis. All haplotypes with a P-value less than 0.01 are shown. The horizontal bars indicate the span of the corresponding haplotypes and the marker density is shown at the bottom of the figure. All locations refer to NCBI Build 33 and the 1-LOD-drop spans from 167.64 to 171.28 Mb.

FIG. 7 schematically shows the location of genes and markers in region B. The microsatellites used in the locus-wide association study are shown as filled circles at the top. The filled boxes indicate the locations of exons, or clusters of exons, for KCHIP1. The shaded boxes indicated the location and size of the neighboring genes, LCP2, KCNMB1, GABRP and RANBP17, and the grey horizontal lines indicate the span of the five most significant microsatellite haplotypes in the region.

DETAILED DESCRIPTION OF THE INVENTION

Extensive genealogical information for a population with population-based lists of patients with Type II diabetes has been combined with powerful gene sharing methods to map a locus on chromosome 5q35. Diabetics and their relatives were genotyped with a genome-wide marker set including 906 microsatellite markers, with an average marker density of 4cM. Due to the role obesity plays in the development of diabetes, the material was fractionated according to body mass index (BMI). Presented herein are results of a genome wide search of genes that cause Type II diabetes in Iceland..

Loci Associated with Diabetes

Evidence for genes causing the early onset monogenic form of diabetes have been previously identified. Mutations in six genes have been discovered that cause MODY, or maturity onset diabetes of the young. MODY1 – MODY6 are due to mutations in HNF4a, glucokinase, HNF1a, IPF1, HNF1b and NEUROD1 (MODY1:

Yamagata K, *et al., Nature* 384:458-460 (1996); MODY2: Froguel P, F *et al., Nature* 356: 162-164(1992); MODY3: Yamagata, K., *et al., Nature* 384: 455-458 (1996); MODY4: Yoshioka M., *et al., Diabetes* May;46(5):887-94 (1997) MODY5: Horikawa, Y., *et al., Nat. Genet.* 17: 384-385 (1997) MODY6: Kristinsson S.Y., *et al., Diabetologia* Nov:44(11):2098-103 (2001)).

One gene has been identified as a disease gene that contributes to the late-onset form of diabetes, the calpain 10 gene (CAPN10). CAPN10, was identified though a genome-wide screen of Mexican American sibpairs with diabetes (Horikawa, Y., *et al., Nat. Genet.* 26(2) 163-175(2000)). The risk allele has been shown to be associated with impaired regulation of glucose-induced secretion and decreased rate of insulin-stimulated glucose disposal (Lynn, S., *et al., Diabetes,* 51(1): 247-250 (2002); Sreenan, S.K., *et al., Diabetes* 50(9) 2013-2020 (2001) and Baier, L. J., *et al., J. Clin. Invest.* 106(7) R69-73 (2000)).

Many genome-wide screens in a variety of populations have been performed that have resulted in major loci for Diabetes. Loci are reported on chromosome 2q37 (Hanis, C.L., *et al., Nat. Genet.*, 13(2):161-166 (1996)), chromosome 15q21 (Cox, *et al., Nat. Genet.* 21(2):213-215 (1999)), chromosome 10q26 (Duggirala, R., *et al., Am. J. Hum. Genet.*, 68(5):1149-1164 (2001)), chromosome 3p (Ehm, M.G., *et al., Am. J. Hum. Genet.*, 66(6):1871-1881 (2000)) in Mexican Americans, and chromosomes 1q21-23 and 11q23-q25 (Hanson R. L. *et al., Am J. Hum Genet.*, 63(4):1130-1138 (1998)) in PIMA Indians. In the Caucasian population, linkages have been observed to chromosome 12q24 in Finns (Mahtani, *et al., Nat. Genet.,* 14(1):90-4 (1994)), chromosome 1q21-q23 in Americans in Utah (Elbein, S.C., *et al., Diabetes,* 48(5):1175-1182 (1999)), chromosome 3q27-pter in French families (Vionnet, N., *et al., Am. J. Hum. Genet.* 67(6):1470-80 (2000) and chromosome 18p11 in Scandinavians (Parker, A., *et al., Diabetes,* 50(3) 675-680 (2001)). A recent study

reported a major locus in indigenous Australians on chromosome 2q24.3 (Busfield, F,. *et al., Am. J. Hum. Genet.*, 70(2): 349-357 (2002)). Many other studies have resulted in suggestive loci or have replicated these loci.

Association studies have been reported for Type II diabetes. Most of these studies show modest association to the disease in a group of people but do not account for the disease. Altshuler *et al.*, reviewed the association work that has been done and concluded that association to only one of 16 genes revealed held up to scrutiny. Altshuler *et al.*, confirmed that the Pro12Ala polymorphism in PPARg is associated with Type II diabetes. Until now, there have been no linkage studies in Type II diabetes linking the disease to chromosome 5q35

KChIP1

The invention described herein has linked Type II diabetes to a gene encoding Kv channel-interacting protein 1 (KChIP1; also known as KCNIP1). In the brain and heart, rapidly inactivating (A-type) voltage-gated potassium (Kv) currents operate at subthreshold membrane potentials to control the excitability of neurons and cardiac myocytes. Although pore-forming alpha-subunits of the Kv4, or Shal-related, channel family form A-Type currents in heterologous cells, these differ significantly from native A-Type currents. To identify proteins that interacted with the Kv4 subunit, An *et al.*, ("Modulation of A-Type potassium channels by a family of calcium sensors" *Nature* 403:553-6 (2000)) used the yeast two-hybrid system with the intracellular amino terminus of the rat Kv4.3 subunit to screen rat midbrain cDNA libraries. Two Kv channel-interacting proteins were identified and called KChIPs (KChIP-1 and KChIP2). Library screening and database mining identified mouse and human orthologs of these genes. The KChIP1 cDNA encodes a 216-amino acid protein. The KChIPs have 4 EF-hand-like domains and bind calcium ions. Both KChIPs have distinct N termini but share approximately 70% amino acid identity throughout a carboxy-terminal 185-amino acid core domain that contains the 4 EF-hand-like motifs. Although the KChIPs have around 40% amino acid similarity to neuronal calcium sensor-1 and are members of the recoverin /NCS subfamily of calcium-binding proteins, other members of this subfamily, such as hippocalcin, did not

interact with Kv4 channels in the yeast 2-hybrid assay. An *et al.*, (*supra*) additionally found that expression of KChIPs and Kv4 together reconstitutes several features of native A-Type currents by modulating the density, inactivation kinetics, and rate of recovery from inactivation of Kv4 channels in heterologous cells. Both KChIPs colocalize and coimmunoprecipitate with brain Kv4 alpha-subunits, and are thus integral components of native Kv4 channel complexes. As the activity and density of neuronal A-Type currents tightly control responses to excitatory synaptic inputs, these KChIPs may regulate A-Type currents, and hence neuronal excitability, in response to changes in intracellular calcium.

The glycosphingolipid sulfatide is present in secretory granules and at the surface of pancreatic β-cells (Buschard K, Fredman P. "Sulphatide as an antigen in diabetes mellitus". *Diabetes Nutr Metab* 4:221 –228 (1996)), and antisulfatide antibodies (ASA; IgG1) are found in serum from the majority of patients with newly diagnosed Type I diabetes. Buschard *et al.*, ("Sulfatide controls insulin secretion by modulation of ATP-sensitive K(+)-channel activity and Ca(2+)-dependent exocytosis in rat pancreatic beta-cells" *Diabetes* 51:2514-21 (2002)) demonstrated that sulfatide produced a glucose- and concentration-dependent inhibition of insulin release from isolated rat pancreatic islets. This inhibition of insulin secretion was due to activation of ATP-sensitive K^+-(K_{ATP}) channels in single rat β-cells. No effect of sulfatide was observed on whole-cell Ca^{2+}-channel activity or glucose-induced elevation of cytoplasmic Ca^{2+} concentration. A key observation was that sulfatide stimulated Ca^{2+}-dependent exocytosis determined by capacitance measurements and depolarized-induced insulin secretion from islets exposed to diazoxide and high external KCl. The monoclonal sulfatide antibody Sulph I as well as ASA-positive serum reduced glucose-induced insulin secretion by inhibition of Ca^{2+}-dependent exocytosis. This suggests that sulfatide is important for the control of glucose-induced insulin secretion and that both an increase and a decrease in the sulfatide content have an impact on the secretory capacity of the individual β-cells.

ASSESSMENT FOR AT-RISK HAPLOTYPES

A "haplotype," as described herein, refers to a combination of genetic markers ("alleles"), such as those set forth in Table 2 and Table 5. In a certain embodiment, the haplotype can comprise one or more alleles, two or more alleles, three or more alleles, four or more alleles, or five or more alleles. The genetic markers are particular "alleles" at "polymorphic sites" associated with KChPI1. A nucleotide position at which more than one sequence is possible in a population (either a natural population or a synthetic population, *e.g.*, a library of synthetic molecules) is referred to herein as a "polymorphic site". Where a polymorphic site is a single nucleotide in length, the site is referred to as a single nucleotide polymorphism ("SNP"). For example, if at a particular chromosomal location, one member of a population has an adenine and another member of the population has a thymine at the same position, then this position is a polymorphic site, and, more specifically, the polymorphic site is a SNP. Polymorphic sites can allow for differences in sequences based on substitutions, insertions or deletions. Each version of the sequence with respect to the polymorphic site is referred to herein as an "allele" of the polymorphic site. Thus, in the previous example, the SNP allows for both an adenine allele and a thymine allele.

Typically, a reference sequence is referred to for a particular sequence. Alleles that differ from the reference are referred to as "variant" alleles. For example, the reference KChPI1 sequence is described herein by SEQ ID NO: 1. The term, "variant KChPI1", as used herein, refers to a sequence that differs from SEQ ID NO: 1 but is otherwise substantially similar. The genetic markers that make up the haplotypes described herein are KChPI1 variants. Additional variants can include changes that affect a polypeptide, *e.g.*, the KChPI1 polypeptide. These sequence differences, when compared to a reference nucleotide sequence, can include the insertion or deletion of a single nucleotide, or of more than one nucleotide, resulting in a frame shift; the change of at least one nucleotide, resulting in a change in the encoded amino acid; the change of at least one nucleotide, resulting in the generation of a premature stop codon; the deletion of several nucleotides, resulting in a deletion of one or more amino acids encoded by the nucleotides; the insertion of one or several nucleotides, such as by unequal recombination or gene conversion, resulting in an

interruption of the coding sequence of a reading frame; duplication of all or a part of a sequence; transposition; or a rearrangement of a nucleotide sequence, as described in detail above. Such sequence changes alter the polypeptide encoded by a KChPI1 nucleic acid. For example, if the change in the nucleic acid sequence causes a frame shift, the frame shift can result in a change in the encoded amino acids, and/or can result in the generation of a premature stop codon, causing generation of a truncated polypeptide. Alternatively, a polymorphism associated with Type II diabetes or a susceptibility to Type II diabetes can be a synonymous change in one or more nucleotides (*i.e.*, a change that does not result in a change in the amino acid sequence). Such a polymorphism can, for example, alter splice sites, affect the stability or transport of mRNA, or otherwise affect the transcription or translation of the polypeptide. The polypeptide encoded by the reference nucleotide sequence is the "reference" polypeptide with a particular reference amino acid sequence, and polypeptides encoded by variant alleles are referred to as "variant" polypeptides with variant amino acid sequences.

Haplotypes are a combination of genetic markers, *e.g.*, particular alleles at polymorphic sites. The haplotypes described herein, *e.g.*, having markers such as those shown in Table 6, Table 7, Table 9, Table 11, Table 12 and Table 13 are found more frequently in individuals with Type II diabetes than in individuals without Type II diabetes. Therefore, these haplotypes have predictive value for detecting Type II diabetes or a susceptibility to Type II diabetes in an individual. The haplotypes described herein are a combination of various genetic markers, *e.g.*, SNPs and microsatellites. Therefore, detecting haplotypes can be accomplished by methods known in the art for detecting sequences at polymorphic sites, such as the methods described above.

In certain methods described herein, an individual who is at risk for Type II diabetes is an individual in whom an at-risk haplotype is identified. In one embodiment, the at-risk haplotype is one that confers a significant risk of Type II diabetes. In one embodiment, significance associated with a haplotype is measured by an odds ratio. In a further embodiment, the significance is measured by a percentage. In one embodiment, a significant risk is measured as an odds ratio of at

least about 1.2, including but not limited to: 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8 and 1.9. In a further embodiment, an odds ratio of at least 1.2 is significant. In a further embodiment, an odds ratio of at least about 1.5 is significant. In a further embodiment, a significant increase in risk is at least about 1.7 is significant. In a further embodiment, a significant increase in risk is at least about 20%, including but not limited to about 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65%, 70%, 75%, 80%, 85%, 90%, 95% and 98%. In a further embodiment, a significant increase in risk is at least about 50%. It is understood however, that identifying whether a risk is medically significant may also depend on a variety of factors, including the specific disease, the haplotype, and often, environmental factors.

An at-risk haplotype in, or comprising portions of, the KChPI1 gene, is one where the haplotype is more frequently present in an individual at risk for Type II diabetes (affected), compared to the frequency of its presence in a healthy individual (control), and wherein the presence of the haplotype is indicative of Type II diabetes or susceptibility to Type II diabetes.

Standard techniques for genotyping for the presence of SNPs and/or microsatellite markers can be used, such as fluorescent-based techniques (Chen, *et al.*, *Genome Res. 9*, 492 (1999)), PCR, LCR, Nested PCR and other techniques for nucleic acid amplification. In one embodiment, the method comprises assessing in an individual the presence or frequency of SNPs and/or microsatellites in, comprising portions of, the KChIP1gene, wherein an excess or higher frequency of the SNPs and/or microsatellites compared to a healthy control individual is indicative that the individual has Type II diabetes, or is susceptible to Type II diabetes. See, for example, Table 6, Table 7, Table 9, Table 11, Table 12 and 13 (below) for SNPs and markers that can form haplotypes that can be used as screening tools. These markers and SNPs can be identified in at-risk haploptypes. For example, an at-risk haplotype can include microsatellite markers and/or SNPs such as those set forth in Table 2 and Table 5. The presence of the haplotype is indicative a susceptibility to Type II diabetes, and therefore is indicative of an individual who falls within a target population for the treatment methods described herein.

NUCLEIC ACID THERAPEUTIC AGENTS

In another embodiment, a nucleic acid of the invention; a nucleic acid complementary to a nucleic acid of the invention; or a portion of such a nucleic acid (*e.g.*, an oligonucleotide as described below); or a nucleic acid encoding a KChIP1 polypeptide, can be used in "antisense" therapy, in which a nucleic acid (*e.g.*, an oligonucleotide) which specifically hybridizes to the mRNA and/or genomic DNA of a nucleic acid is administered or generated *in situ*. The antisense nucleic acid that specifically hybridizes to the mRNA and/or DNA inhibits expression of the polypeptide encoded by that mRNA and/or DNA, *e.g.*, by inhibiting translation and/or transcription. Binding of the antisense nucleic acid can be by conventional base pair complementarity, or, for example, in the case of binding to DNA duplexes, through specific interaction in the major groove of the double helix.

An antisense construct can be delivered, for example, as an expression plasmid as described above. When the plasmid is transcribed in the cell, it produces RNA that is complementary to a portion of the mRNA and/or DNA that encodes a KChIP1 polypeptide. Alternatively, the antisense construct can be an oligonucleotide probe that is generated *ex vivo* and introduced into cells; it then inhibits expression by hybridizing with the mRNA and/or genomic DNA of the polypeptide. In one embodiment, the oligonucleotide probes are modified oligonucleotides that are resistant to endogenous nucleases, *e.g.*, exonucleases and/or endonucleases, thereby rendering them stable *in vivo*. Exemplary nucleic acid molecules for use as antisense oligonucleotides are phosphoramidate, phosphothioate and methylphosphonate analogs of DNA (see also U.S. Patent Nos. 5,176,996, 5,264,564 and 5,256,775). Additionally, general approaches to constructing oligomers useful in antisense therapy are also described, for example, by Van der Krol *et al.* (*BioTechniques* 6:958-976 (1988)); and Stein *et al.* (*Cancer Res.* 48:2659-2668 (1988)). With respect to antisense DNA, oligodeoxyribonucleotides derived from the translation initiation site are preferred.

To perform antisense therapy, oligonucleotides (mRNA, cDNA or DNA) are designed that are complementary to mRNA encoding the polypeptide. The antisense oligonucleotides bind to mRNA transcripts and prevent translation. Absolute

complementarity, although preferred, is not required. A sequence "complementary" to a portion of an RNA, as referred to herein, indicates that a sequence has sufficient complementarity to be able to hybridize with the RNA, forming a stable duplex; in the case of double-stranded antisense nucleic acids, a single strand of the duplex DNA may thus be tested, or triplex formation may be assayed. The ability to hybridize will depend on both the degree of complementarity and the length of the antisense nucleic acid, as described in detail above. Generally, the longer the hybridizing nucleic acid, the more base mismatches with an RNA it may contain and still form a stable duplex (or triplex, as the case may be). One skilled in the art can ascertain a tolerable degree of mismatch by use of standard procedures.

The oligonucleotides used in antisense therapy can be DNA, RNA, or chimeric mixtures or derivatives or modified versions thereof, single-stranded or double-stranded. The oligonucleotides can be modified at the base moiety, sugar moiety, or phosphate backbone, for example, to improve stability of the molecule, hybridization, etc. The oligonucleotides can include other appended groups such as peptides (*e.g.,* for targeting host cell receptors *in vivo*), or agents facilitating transport across the cell membrane (see, *e.g.*, Letsinger *et al.*, *Proc. Natl. Acad. Sci. USA* 86:6553-6556 (1989); Lemaitre *et al.*, *Proc. Natl. Acad. Sci. USA* 84:648-652 (1987); PCT International Publication NO: WO 88/09810) or the blood-brain barrier (see, *e.g.*, PCT International Publication NO: WO 89/10134), or hybridization-triggered cleavage agents (see, *e.g.*, Krol *et al.*, *BioTechniques* 6:958-976 (1988)) or intercalating agents. (See, *e.g.*, Zon, *Pharm.Res*. 5: 539-549 (1988)). To this end, the oligonucleotide may be conjugated to another molecule (*e.g.*, a peptide, hybridization triggered cross-linking agent, transport agent, hybridization-triggered cleavage agent).

The antisense molecules are delivered to cells that express a KChIP1 polypeptide *in vivo*. A number of methods can be used for delivering antisense DNA or RNA to cells; *e.g.*, antisense molecules can be injected directly into the tissue site, or modified antisense molecules, designed to target the desired cells (*e.g.*, antisense linked to peptides or antibodies that specifically bind receptors or antigens expressed on the target cell surface) can be administered systematically. Alternatively, in a another embodiment, a recombinant DNA construct is utilized in which the antisense

oligonucleotide is placed under the control of a strong promoter (*e.g.*, pol III or pol II). The use of such a construct to transfect target cells in the patient results in the transcription of sufficient amounts of single stranded RNAs that will form complementary base pairs with the endogenous transcripts and thereby prevent translation of the mRNA. For example, a vector can be introduced *in vivo* such that it is taken up by a cell and directs the transcription of an antisense RNA. Such a vector can remain episomal or become chromosomally integrated, as long as it can be transcribed to produce the desired antisense RNA. Such vectors can be constructed by recombinant DNA technology methods standard in the art and described above. For example, a plasmid, cosmid, YAC or viral vector can be used to prepare the recombinant DNA construct that can be introduced directly into the tissue site. Alternatively, viral vectors can be used which selectively infect the desired tissue, in which case administration may be accomplished by another route (*e.g.*, systemically). In another embodiment of the invention, small double-stranded interfering RNA (RNA interference (RNAi)) can be used. RNAi is a post-transcription process, in which double-stranded RNA is introduced, and sequence-specific gene silencing results, though catalytic degradation of the targeted mRNA. See, *e.g.*, Elbashir, S.M. *et al.*, *Nature 411*:494-498 (2001); Lee, N.S., *Nature Biotech. 19*:500-505 (2002); Lee, S-K. *et al., Nature Medicine 8(7):*681-686 (2002); the entire teachings of these references are incorporated herein by reference.

Endogenous expression of a gene product can also be reduced by inactivating or "knocking out" the gene or its promoter using targeted homologous recombination (*e.g.*, see Smithies *et al.*, *Nature* 317:230-234 (1985); Thomas & Capecchi, *Cell* 51:503-512 (1987); Thompson *et al.*, *Cell* 5:313-321 (1989)). For example, an altered, non-functional gene (or a completely unrelated DNA sequence) flanked by DNA homologous to the endogenous gene (either the coding regions or regulatory regions of the gene) can be used, with or without a selectable marker and/or a negative selectable marker, to transfect cells that express the gene *in vivo*. Insertion of the DNA construct, via targeted homologous recombination, results in inactivation of the gene. The recombinant DNA constructs can be directly administered or targeted to the required site *in vivo* using appropriate vectors, as described above.

Alternatively, expression of non-altered genes can be increased using a similar method: targeted homologous recombination can be used to insert a DNA construct comprising a non-altered functional gene, or the complement thereof, or a portion thereof, in place of an gene in the cell, as described above. In another embodiment, targeted homologous recombination can be used to insert a DNA construct comprising a nucleic acid that encodes a polypeptide variant that differs from that present in the cell.

Alternatively, endogenous expression of a gene product can be reduced by targeting deoxyribonucleotide sequences complementary to the regulatory region (*i.e.*, the promoter and/or enhancers) to form triple helical structures that prevent transcription of the gene in target cells in the body. (See generally, Helene, C., *Anticancer Drug Des.*, 6(6):569-84 (1991); Helene, C. *et al.*, *Ann. N.Y. Acad. Sci.* 660:27-36 (1992); and Maher, L. J., *Bioassays* 14(12):807-15 (1992)). Likewise, the antisense constructs described herein, by antagonizing the normal biological activity of the gene product, can be used in the manipulation of tissue, *e.g.*, tissue differentiation, both *in vivo* and *for ex vivo* tissue cultures. Furthermore, the anti-sense techniques (*e.g.*, microinjection of antisense molecules, or transfection with plasmids whose transcripts are anti-sense with regard to a nucleic acid RNA or nucleic acid sequence) can be used to investigate the role of one or more members of the KChIP1 pathway in the development of disease-related conditions. Such techniques can be utilized in cell culture, but can also be used in the creation of transgenic animals.

The therapeutic agents as described herein can be delivered in a composition, as described above, or alone. They can be administered systemically, or can be targeted to a particular tissue. The therapeutic agents can be produced by a variety of means, including chemical synthesis; recombinant production; *in vivo* production (*e.g.*, a transgenic animal, such as U.S. Patent NO: 4,873,316 to Meade *et al.*), for example, and can be isolated using standard means such as those described herein. In addition, a combination of any of the above methods of treatment (*e.g.*, administration of non-altered polypeptide in conjunction with antisense therapy targeting altered

mRNA; administration of a first splicing variant in conjunction with antisense therapy targeting a second splicing variant) can also be used.

The invention additionally pertains to use of such therapeutic agents, as described herein, for the manufacture of a medicament for the treatment of Type II diabetes e.g., using the methods described herein.

MONITORING PROGRESS OF TREATMENT

The current invention also pertains to methods of monitoring the effectiveness of treatment on the regulation of expression (*e.g.*, relative or absolute expression) of one or more KChIP1 isoforms at the RNA or protein level or its enzymatic activity. KChIP1 message or protein or enzymatic activity can be measured in a sample of peripheral blood or cells derived therefrom.. An assessment of the levels of expression or activity can be made before and during treatment with KChIP1 therapeutic agents. For example, in one embodiment of the invention, an individual who is a member of the target population can be assessed for response to treatment with a KChIP1 inhibitor, by examining calcium levels or Kv channel-interacting proteins activity or absolute and/or relative levels of KChIP1 protein or mRNA isoforms in peripheral blood in general or specific cell subfractions or combination of cell subfractions. In addition, variation such as haplotypes or mutations within or near (within 100 to 200kb) of the KChIP1 gene may be used to identify individuals who are at higher risk for Type II diabetes to increase the power and efficiency of clinical trials for pharmaceutical agents to prevent or treat Type II diabetes. The haplotypes and other variations may be used to exclude or fractionate patients in a clinical trial who are likely to have non- KChIP1 involvement in their Type II diabetes risk in order to enrich patients who have other genes or pathways involved and boost the power and sensitivity of the clinical trial. Such variation may be used as a pharmacogenomic test to guide selection of pharmaceutical agents for individuals.

Described herein is the first known linkage study of Type II diabetes showing a connection to chromosome 5q35. Based on the linkage studies conducted, a direct relationship between Type II diabetes and the locus on chromosome 5q35, in particular the KChIP1 gene, has been discovered.

NUCLEIC ACIDS OF THE INVENTION

KChIP1 Nucleic Acids, Portions and Variants

Accordingly, the invention pertains to isolated nucleic acid molecules comprising human KChIP1 nucleic acid. The term, "KChIP1 nucleic acid," as used herein, refers to an isolated nucleic acid molecule encoding a KChIP1 polypeptide (*e.g.*, a KChIP1 gene, such as shown in SEQ ID NO:1). The KChIP1 nucleic acid molecules of the present invention can be RNA, for example, mRNA, or DNA, such as cDNA and genomic DNA. DNA molecules can be double-stranded or single-stranded; single stranded RNA or DNA can be either the coding, or sense, strand or the non-coding, or antisense strand. The nucleic acid molecule can include all or a portion of the coding sequence of the gene and can further comprise additional non-coding sequences such as introns and non-coding 3' and 5' sequences (including regulatory sequences, for example).

For example, the KChIP1 nucleic acid can the genomic sequence shown in FIG. 1, or a portion or fragment of the isolated nucleic acid molecule (*e.g.*, cDNA or the gene) that encodes KChIP1 polypeptide. In certain embodiments, the isolated nucleic acid molecule comprises a nucleic acid molecule selected from the group consisting of SEQ ID NOs: 1 and 114-258 (*e.g.*, in Table 10) or the complement of such a nucleic acid molecule.

Additionally, nucleic acid molecules of the invention can be fused to a marker sequence, for example, a sequence that encodes a polypeptide to assist in isolation or purification of the polypeptide. Such sequences include, but are not limited to, those that encode a glutathione-S-transferase (GST) fusion protein and those that encode a hemagglutinin A (HA) polypeptide marker from influenza.

An "isolated" nucleic acid molecule, as used herein, is one that is separated from nucleic acids that normally flank the gene or nucleotide sequence (as in genomic sequences) and/or has been completely or partially purified from other transcribed sequences (*e.g.*, as in an RNA library). For example, an isolated nucleic acid of the invention may be substantially isolated with respect to the complex cellular milieu in

which it naturally occurs, or culture medium when produced by recombinant techniques, or chemical precursors or other chemicals when chemically synthesized. In some instances, the isolated material will form part of a composition (for example, a crude extract containing other substances), buffer system or reagent mix. In other circumstances, the material may be purified to essential homogeneity, for example as determined by PAGE or column chromatography such as HPLC. Preferably, an isolated nucleic acid molecule comprises at least about 50, 80 or 90% (on a molar basis) of all macromolecular species present. With regard to genomic DNA, the term "isolated" also can refer to nucleic acid molecules that are separated from the chromosome with which the genomic DNA is naturally associated. For example, the isolated nucleic acid molecule can contain less than about 5 kb but not limited to 4 kb, 3 kb, 2 kb, 1 kb, 0.5 kb or 0.1 kb of nucleotides which flank the nucleic acid molecule in the genomic DNA of the cell from which the nucleic acid molecule is derived.

The nucleic acid molecule can be fused to other coding or regulatory sequences and still be considered isolated. Thus, recombinant DNA contained in a vector is included in the definition of "isolated" as used herein. Also, isolated nucleic acid molecules include recombinant DNA molecules in heterologous host cells, as well as partially or substantially purified DNA molecules in solution. "Isolated" nucleic acid molecules also encompass *in vivo* and *in vitro* RNA transcripts of the DNA molecules of the present invention. An isolated nucleic acid molecule can include a nucleic acid molecule or nucleic acid sequence that is synthesized chemically or by recombinant means. Therefore, recombinant DNA contained in a vector is included in the definition of "isolated" as used herein. Also, isolated nucleic acid molecules include recombinant DNA molecules in heterologous organisms, as well as partially or substantially purified DNA molecules in solution. *In vivo* and *in vitro* RNA transcripts of the DNA molecules of the present invention are also encompassed by "isolated" nucleic acid sequences. Such isolated nucleic acid molecules are useful in the manufacture of the encoded polypeptide, as probes for isolating homologous sequences (*e.g.*, from other mammalian species), for gene mapping (*e.g.*, by *in situ* hybridization with chromosomes), or for detecting

expression of the gene in tissue (*e.g.*, human tissue), such as by Northern blot analysis.

The present invention also pertains to nucleic acid molecules which are not necessarily found in nature but which encode a KChIP1 polypeptide, or another splicing variant of a KChIP1 polypeptide or polymorphic variant thereof. Thus, for example, the invention pertains to DNA molecules comprising a sequence that is different from the naturally occurring nucleotide sequence but which, due to the degeneracy of the genetic code, encode a KChIP1 polypeptide of the present invention. The invention also encompasses nucleic acid molecules encoding portions (fragments), or encoding variant polypeptides such as analogues or derivatives of a KChIP1 polypeptide. Such variants can be naturally occurring, such as in the case of allelic variation or single nucleotide polymorphisms, or non-naturally-occurring, such as those induced by various mutagens and mutagenic processes. Intended variations include, but are not limited to, addition, deletion and substitution of one or more nucleotides that can result in conservative or non-conservative amino acid changes, including additions and deletions. Preferably the nucleotide (and/or resultant amino acid) changes are silent or conserved; that is, they do not alter the characteristics or activity of a KChIP1 polypeptide. In one embodiment, the nucleic acid sequences are fragments that comprise one or more polymorphic microsatellite markers. In another embodiment, the nucleotide sequences are fragments that comprise one or more single nucleotide polymorphisms in a KChIP1 gene.

Other alterations of the nucleic acid molecules of the invention can include, for example, labeling, methylation, internucleotide modifications such as uncharged linkages (*e.g.*, methyl phosphonates, phosphotriesters, phosphoamidates, carbamates), charged linkages (*e.g.*, phosphorothioates, phosphorodithioates), pendent moieties (*e.g.*, polypeptides), intercalators (*e.g.*, acridine, psoralen), chelators, alkylators, and modified linkages (*e.g.*, alpha anomeric nucleic acids). Also included are synthetic molecules that mimic nucleic acid molecules in the ability to bind to a designated sequence via hydrogen bonding and other chemical interactions. Such molecules include, for example, those in which peptide linkages substitute for phosphate linkages in the backbone of the molecule.

The invention also pertains to nucleic acid molecules that hybridize under high stringency hybridization conditions, such as for selective hybridization, to a nucleotide sequence described herein (*e.g.*, nucleic acid molecules which specifically hybridize to a nucleotide sequence encoding polypeptides described herein, and, optionally, have an activity of the polypeptide). In one embodiment, the invention includes variants described herein which hybridize under high stringency hybridization conditions (*e.g.*, for selective hybridization) to a nucleotide sequence comprising a nucleotide sequence selected from the group consisting of SEQ ID NOs: 114-258. In another embodiment, the invention includes variants described herein that hybridize under high stringency hybridization conditions (*e.g.*, for selective hybridization) to a nucleotide sequence encoding an amino acid sequence or a polymorphic variant thereof. In another embodiment, the variant that hybridizes under high stringency hybridizations has an activity of a KChIP1 polypeptide.

Such nucleic acid molecules can be detected and/or isolated by specific hybridization (*e.g.*, under high stringency conditions). "Specific hybridization," as used herein, refers to the ability of a first nucleic acid to hybridize to a second nucleic acid in a manner such that the first nucleic acid does not hybridize to any nucleic acid other than to the second nucleic acid (*e.g.*, when the first nucleic acid has a higher similarity to the second nucleic acid than to any other nucleic acid in a sample wherein the hybridization is to be performed). "Stringency conditions" for hybridization is a term of art which refers to the incubation and wash conditions, *e.g.*, conditions of temperature and buffer concentration, which permit hybridization of a particular nucleic acid to a second nucleic acid; the first nucleic acid may be perfectly (*i.e.*, 100%) complementary to the second, or the first and second may share some degree of complementarity which is less than perfect (*e.g.*, 70%, 75%, 85%, 90%, 95%). For example, certain high stringency conditions can be used which distinguish perfectly complementary nucleic acids from those of less complementarity. "High stringency conditions", "moderate stringency conditions" and "low stringency conditions" for nucleic acid hybridizations are explained on pages 2.10.1-2.10.16 and pages 6.3.1-6.3.6 in *Current Protocols in Molecular Biology* (Ausubel, F.M. *et al.*, "*Current Protocols in Molecular Biology*", John Wiley & Sons, (2001)), the entire

teachings of which are incorporated by reference herein). The exact conditions which determine the stringency of hybridization depend not only on ionic strength (*e.g.*, 0.2X SSC, 0.1X SSC), temperature (*e.g.*, room temperature, 42°C, 68°C) and the concentration of destabilizing agents such as formamide or denaturing agents such as SDS, but also on factors such as the length of the nucleic acid sequence, base composition, percent mismatch between hybridizing sequences and the frequency of occurrence of subsets of that sequence within other non-identical sequences. Thus, equivalent conditions can be determined by varying one or more of these parameters while maintaining a similar degree of identity or similarity between the two nucleic acid molecules. Typically, conditions are used such that sequences at least about 60%, at least about 70%, at least about 80%, at least about 90%, or at least about 95% or more identical to each other remain hybridized to one another. By varying hybridization conditions from a level of stringency at which no hybridization occurs to a level at which hybridization is first observed, conditions which will allow a given sequence to hybridize (*e.g.*, selectively) with the most similar sequences in the sample can be determined.

Exemplary conditions are described in Krause, M.H. and S.A. Aaronson, *Methods in Enzymology* 200:546-556 (1991), and in, Ausubel, *et al.*, "*Current Protocols in Molecular Biology*", John Wiley & Sons, (2001), which describes the determination of washing conditions for moderate or low stringency conditions. Washing is the step in which conditions are usually set so as to determine a minimum level of complementarity of the hybrids. Generally, starting from the lowest temperature at which only homologous hybridization occurs, each °C by which the final wash temperature is reduced (holding SSC concentration constant) allows an increase by 1% in the maximum extent of mismatching among the sequences that hybridize. Generally, doubling the concentration of SSC results in an increase in T_m of -17°C. Using these guidelines, the washing temperature can be determined empirically for high, moderate or low stringency, depending on the level of mismatch sought.

For example, a low stringency wash can comprise washing in a solution containing 0.2X SSC/0.1% SDS for 10 minutes at room temperature; a moderate

stringency wash can comprise washing in a pre-warmed solution (42°C) solution containing 0.2X SSC/0.1% SDS for 15 minutes at 42°C; and a high stringency wash can comprise washing in pre-warmed (68°C) solution containing 0.1X SSC/0.1%SDS for 15 minutes at 68°C. Furthermore, washes can be performed repeatedly or sequentially to obtain a desired result as known in the art. Equivalent conditions can be determined by varying one or more of the parameters given as an example, as known in the art, while maintaining a similar degree of identity or similarity between the target nucleic acid molecule and the primer or probe used.

The percent homology or identity of two nucleotide or amino acid sequences can be determined by aligning the sequences for optimal comparison purposes (*e.g.*, gaps can be introduced in the sequence of a first sequence for optimal alignment). The nucleotides or amino acids at corresponding positions are then compared, and the percent identity between the two sequences is a function of the number of identical positions shared by the sequences (*i.e.*, % identity = # of identical positions/total # of positions x 100). When a position in one sequence is occupied by the same nucleotide or amino acid residue as the corresponding position in the other sequence, then the molecules are homologous at that position. As used herein, nucleic acid or amino acid "homology" is equivalent to nucleic acid or amino acid "identity". In certain embodiments, the length of a sequence aligned for comparison purposes is at least 30%, for example, at least 40%, in certain embodiments at least 60%, and in other embodiments at least 70%, 80%, 90% or 95% of the length of the reference sequence. The actual comparison of the two sequences can be accomplished by well-known methods, for example, using a mathematical algorithm. A preferred, non-limiting example of such a mathematical algorithm is described in Karlin *et al.*, *Proc. Natl. Acad. Sci. USA* 90:5873-5877 (1993). Such an algorithm is incorporated into the NBLAST and XBLAST programs (version 2.0) as described in Altschul *et al.*, *Nucleic Acids Res.* 25:389-3402 (1997). When utilizing BLAST and Gapped BLAST programs, the default parameters of the respective programs (*e.g.*, NBLAST) can be used. In one embodiment, parameters for sequence comparison can be set at score=100, wordlength=12, or can be varied (*e.g.*, W=5 or W=20).

Another preferred, non-limiting example of a mathematical algorithm utilized for the comparison of sequences is the algorithm of Myers and Miller, *CABIOS* 4(1): 11-17 (1988). Such an algorithm is incorporated into the ALIGN program (version 2.0) which is part of the GCG sequence alignment software package (Accelrys, Cambridge, UK). When utilizing the ALIGN program for comparing amino acid sequences, a PAM120 weight residue table, a gap length penalty of 12, and a gap penalty of 4 can be used. Additional algorithms for sequence analysis are known in the art and include ADVANCE and ADAM as described in Torellis and Robotti, *Comput. Appl. Biosci.* 10:3-5 (1994); and FASTA described in Pearson and Lipman, *Proc. Natl. Acad. Sci. USA* 85:2444-8 (1988).

In another embodiment, the percent identity between two amino acid sequences can be accomplished using the GAP program in the GCG software package using either a BLOSUM63 matrix or a PAM250 matrix, and a gap weight of 12, 10, 8, 6, or 4 and a length weight of 2, 3, or 4. In yet another embodiment, the percent identity between two nucleic acid sequences can be accomplished using the GAP program in the GCG software package using a gap weight of 50 and a length weight of 3.

The present invention also provides isolated nucleic acid molecules that contain a fragment or portion that hybridizes under highly stringent conditions to a nucleotide sequence comprising a nucleotide sequence selected from the group consisting of SEQ ID NOs: 1, 114-258, or the complement of such a sequence, and also provides isolated nucleic acid molecules that contain a fragment or portion that hybridizes under highly stringent conditions to a nucleotide sequence encoding an amino acid sequence or polymorphic variant thereof. The nucleic acid fragments of the invention are at least about 15, preferably at least about 18, 20, 23 or 25 nucleotides, and can be 30, 40, 50, 100, 200 or more nucleotides in length. Longer fragments, for example, 30 or more nucleotides in length, that encode antigenic polypeptides described herein are particularly useful, such as for the generation of antibodies as described below.

Probes and Primers

In a related aspect, the nucleic acid fragments of the invention are used as probes or primers in assays such as those described herein. "Probes" or "primers" are oligonucleotides that hybridize in a base-specific manner to a complementary strand of nucleic acid molecules. Such probes and primers include polypeptide nucleic acids, as described in Nielsen *et al., Science* 254:1497-1500 (1991).

A probe or primer comprises a region of nucleotide sequence that hybridizes to at least about 15, for example about 20-25, and in certain embodiments about 40, 50 or 75, consecutive nucleotides of a nucleic acid molecule comprising a contiguous nucleotide sequence selected from the group consisting of SEQ ID NOs: 1, 114-258 or polymorphic variant thereof. In other embodiments, a probe or primer comprises 100 or fewer nucleotides, in certain embodiments from 6 to 50 nucleotides, for example from 12 to 30 nucleotides. In other embodiments, the probe or primer is at least 70% identical to the contiguous nucleotide sequence or to the complement of the contiguous nucleotide sequence, for example at least 80% identical, in certain embodiments at least 90% identical, and in other embodiments at least 95% identical, or even capable of selectively hybridizing to the contiguous nucleotide sequence or to the complement of the contiguous nucleotide sequence. Often, the probe or primer further comprises a label, *e.g.*, radioisotope, fluorescent compound, enzyme, or enzyme co-factor.

The nucleic acid molecules of the invention such as those described above can be identified and isolated using standard molecular biology techniques and the sequence information provided herein. For example, nucleic acid molecules can be amplified and isolated by the polymerase chain reaction using synthetic oligonucleotide primers designed based on one or more of the sequences selected from the group consisting of SEQ ID NOs: 1, 114-258 or the complement of such a sequence, or designed based on nucleotides based on sequences encoding one or more of the amino acid sequences provided herein. See generally *PCR Technology: Principles and Applications for DNA Amplification* (ed. H.A. Erlich, Freeman Press, NY, NY, 1992); *PCR Protocols: A Guide to Methods and Applications* (Eds. Innis *et al.*, Academic Press, San Diego, CA, 1990); Mattila *et al., Nucl. Acids Res.* 19: 4967

(1991); Eckert *et al.*, *PCR Methods and Applications* 1:17 (1991); PCR (eds. McPherson *et al.*, IRL Press, Oxford); and U.S. Patent 4,683,202. The nucleic acid molecules can be amplified using cDNA, mRNA or genomic DNA as a template, cloned into an appropriate vector and characterized by DNA sequence analysis.

Other suitable amplification methods include the ligase chain reaction (LCR) (see Wu and Wallace, *Genomics* 4:560 (1989), Landegren *et al.*, *Science* 241:1077 (1988), transcription amplification (Kwoh *et al.*, *Proc. Natl. Acad. Sci. USA* 86:1173 (1989)), and self-sustained sequence replication (Guatelli *et al.*, *Proc. Nat. Acad. Sci. USA* 87:1874 (1990)) and nucleic acid based sequence amplification (NASBA). The latter two amplification methods involve isothermal reactions based on isothermal transcription, which produce both single stranded RNA (ssRNA) and double stranded DNA (dsDNA) as the amplification products in a ratio of about 30 or 100 to 1, respectively.

The amplified DNA can be labeled, for example, radiolabeled, and used as a probe for screening a cDNA library derived from human cells, mRNA in zap express, ZIPLOX or other suitable vector. Corresponding clones can be isolated, DNA can obtained following *in vivo* excision, and the cloned insert can be sequenced in either or both orientations by art recognized methods to identify the correct reading frame encoding a polypeptide of the appropriate molecular weight. For example, the direct analysis of the nucleotide sequence of nucleic acid molecules of the present invention can be accomplished using well-known methods that are commercially available. See, for example, Sambrook *et al.*, *Molecular Cloning, A Laboratory Manual* (2nd Ed., CSHP, New York 1989); Zyskind *et al.*, *Recombinant DNA Laboratory Manual*, (Acad. Press, 1988)). Additionally, fluorescence methods are also available for analyzing nucleic acids (Chen *et al.*, *Genome Res.* 9, 492 (1999)) and polypeptides. Using these or similar methods, the polypeptide and the DNA encoding the polypeptide can be isolated, sequenced and further characterized.

Antisense nucleic acid molecules of the invention can be designed using the nucleotide sequences of one or more of SEQ ID NOs: 1, 114-258 and/or the complement of one or more of SEQ ID NOs: 1, 114-258 and/or a portion of one or more of SEQ ID NOs: 1, 114-258 or the complement of one or more of SEQ ID NOs:

1, 114-258 and constructed using chemical synthesis and enzymatic ligation reactions using procedures known in the art. For example, an antisense nucleic acid molecule (*e.g.*, an antisense oligonucleotide) can be chemically synthesized using naturally occurring nucleotides or variously modified nucleotides designed to increase the biological stability of the molecules or to increase the physical stability of the duplex formed between the antisense and sense nucleic acids, *e.g.*, phosphorothioate derivatives and acridine substituted nucleotides can be used. Alternatively, the antisense nucleic acid molecule can be produced biologically using an expression vector into which a nucleic acid molecule has been subcloned in an antisense orientation (*i.e.*, RNA transcribed from the inserted nucleic acid molecule will be of an antisense orientation to a target nucleic acid of interest).

The nucleic acid sequences can also be used to compare with endogenous DNA sequences in patients to identify one or more of the disorders described above, and as probes, such as to hybridize and discover related DNA sequences or to subtract out known sequences from a sample. The nucleic acid sequences can further be used to derive primers for genetic fingerprinting, to raise anti-polypeptide antibodies using DNA immunization techniques, and as an antigen to raise anti-DNA antibodies or elicit immune responses. Portions or fragments of the nucleotide sequences identified herein (and the corresponding complete gene sequences) can be used in numerous ways as polynucleotide reagents. For example, these sequences can be used to: (i) map their respective genes on a chromosome; and, thus, locate gene regions associated with genetic disease; (ii) identify an individual from a minute biological sample (tissue typing); and (iii) aid in forensic identification of a biological sample. Additionally, the nucleotide sequences of the invention can be used to identify and express recombinant polypeptides for analysis, characterization or therapeutic use, or as markers for tissues in which the corresponding polypeptide is expressed, either constitutively, during tissue differentiation, or in diseased states. The nucleic acid sequences can additionally be used as reagents in the screening and/or diagnostic assays described herein, and can also be included as components of kits (*e.g.*, reagent kits) for use in the screening and/or diagnostic assays described herein.

Vectors and Host Cells

Another aspect of the invention pertains to nucleic acid constructs containing a nucleic acid molecule selected from the group consisting of SEQ ID NOs: 1, 114-258 and the complements thereof (or a portion thereof). The constructs comprise a vector (*e.g.*, an expression vector) into which a sequence of the invention has been inserted in a sense or antisense orientation. As used herein, the term "vector" refers to a nucleic acid molecule capable of transporting another nucleic acid to which it has been linked. One type of vector is a "plasmid", which refers to a circular double stranded DNA loop into which additional DNA segments can be ligated. Another type of vector is a viral vector, wherein additional DNA segments can be ligated into the viral genome. Certain vectors are capable of autonomous replication in a host cell into which they are introduced (*e.g.*, bacterial vectors having a bacterial origin of replication and episomal mammalian vectors). Other vectors (*e.g.*, non-episomal mammalian vectors) are integrated into the genome of a host cell upon introduction into the host cell, and thereby are replicated along with the host genome. Expression vectors are capable of directing the expression of genes to which they are operably linked. In general, expression vectors of utility in recombinant DNA techniques are often in the form of plasmids. However, the invention is intended to include such other forms of expression vectors, such as viral vectors (*e.g.*, replication defective retroviruses, adenoviruses and adeno-associated viruses) that serve equivalent functions.

In certain embodiments, recombinant expression vectors of the invention comprise a nucleic acid molecule of the invention in a form suitable for expression of the nucleic acid molecule in a host cell. This means that the recombinant expression vectors include one or more regulatory sequences, selected on the basis of the host cells to be used for expression, which is operably linked to the nucleic acid sequence to be expressed. Within a recombinant expression vector, "operably linked" or "operatively linked" is intended to mean that the nucleotide sequence of interest is linked to the regulatory sequence(s) in a manner which allows for expression of the nucleotide sequence (*e.g.*, in an *in vitro* transcription/translation system or in a host cell when the vector is introduced into the host cell). The term "regulatory sequence"

is intended to include promoters, enhancers and other expression control elements (*e.g.*, polyadenylation signals). Such regulatory sequences are described, for example, in Goeddel, "Gene Expression Technology", *Methods in Enzymology* 185, Academic Press, San Diego, CA (1990). Regulatory sequences include those which direct constitutive expression of a nucleotide sequence in many types of host cell and those which direct expression of the nucleotide sequence only in certain host cells (*e.g.*, tissue-specific regulatory sequences). It will be appreciated by those skilled in the art that the design of the expression vector can depend on such factors as the choice of the host cell to be transformed and the level of expression of polypeptide desired. The expression vectors of the invention can be introduced into host cells to thereby produce polypeptides, including fusion polypeptides, encoded by nucleic acid molecules as described herein.

The recombinant expression vectors of the invention can be designed for expression of a polypeptide of the invention in prokaryotic or eukaryotic cells, *e.g.*, bacterial cells such as *E. coli*, insect cells (using baculovirus expression vectors), yeast cells or mammalian cells. Suitable host cells are discussed further in Goeddel, *supra*. Alternatively, the recombinant expression vector can be transcribed and translated *in vitro*, for example using T7 promoter regulatory sequences and T7 polymerase.

Another aspect of the invention pertains to host cells into which a recombinant expression vector of the invention has been introduced. The terms "host cell" and "recombinant host cell" are used interchangeably herein. It is understood that such terms refer not only to the particular subject cell but also to the progeny or potential progeny of such a cell. Because certain modifications may occur in succeeding generations due to either mutation or environmental influences, such progeny may not, in fact, be identical to the parent cell, but are still included within the scope of the term as used herein.

A host cell can be any prokaryotic or eukaryotic cell. For example, a nucleic acid molecule of the invention can be expressed in bacterial cells (*e.g.*, *E. coli*), insect cells, yeast or mammalian cells (such as Chinese hamster ovary cells (CHO) or COS cells). Other suitable host cells are known to those skilled in the art.

Vector DNA can be introduced into prokaryotic or eukaryotic cells via conventional transformation or transfection techniques. As used herein, the terms "transformation" and "transfection" are intended to refer to a variety of art-recognized techniques for introducing a foreign nucleic acid molecule (*e.g.*, DNA) into a host cell, including calcium phosphate or calcium chloride co-precipitation, DEAE-dextran-mediated transfection, lipofection, or electroporation. Suitable methods for transforming or transfecting host cells can be found in Sambrook, *et al.*, (*supra*), and other laboratory manuals.

For stable transfection of mammalian cells, it is known that, depending upon the expression vector and transfection technique used, only a small fraction of cells may integrate the foreign DNA into their genome. In order to identify and select these integrants, a gene that encodes a selectable marker (*e.g.*, for resistance to antibiotics) is generally introduced into the host cells along with the gene of interest. Preferred selectable markers include those that confer resistance to drugs, such as G418, hygromycin and methotrexate. Nucleic acid molecules encoding a selectable marker can be introduced into a host cell on the same vector as the nucleic acid molecule of the invention or can be introduced on a separate vector. Cells stably transfected with the introduced nucleic acid molecule can be identified by drug selection (*e.g.*, cells that have incorporated the selectable marker gene will survive, while the other cells die).

A host cell of the invention, such as a prokaryotic or eukaryotic host cell in culture, can be used to produce (*i.e.*, express) a polypeptide of the invention. Accordingly, the invention further provides methods for producing a polypeptide using the host cells of the invention. In one embodiment, the method comprises culturing the host cell of invention (into which a recombinant expression vector encoding a polypeptide of the invention has been introduced) in a suitable medium such that the polypeptide is produced. In another embodiment, the method further comprises isolating the polypeptide from the medium or the host cell.

The host cells of the invention can also be used to produce nonhuman transgenic animals. For example, in one embodiment, a host cell of the invention is a fertilized oocyte or an embryonic stem cell into which a nucleic acid molecule of the

invention has been introduced (*e.g.*, an exogenous KChIP1 gene, or an exogenous nucleic acid encoding a KChIP1 polypeptide). Such host cells can then be used to create non-human transgenic animals in which exogenous nucleotide sequences have been introduced into the genome or homologous recombinant animals in which endogenous nucleotide sequences have been altered. Such animals are useful for studying the function and/or activity of the nucleotide sequence and polypeptide encoded by the sequence and for identifying and/or evaluating modulators of their activity. As used herein, a "transgenic animal" is a non-human animal, preferably a mammal, more preferably a rodent such as a rat or mouse, in which one or more of the cells of the animal include a transgene. Other examples of transgenic animals include non-human primates, sheep, dogs, cows, goats, chickens and amphibians. A transgene is exogenous DNA which is integrated into the genome of a cell from which a transgenic animal develops and which remains in the genome of the mature animal, thereby directing the expression of an encoded gene product in one or more cell types or tissues of the transgenic animal. As used herein, an "homologous recombinant animal" is a non-human animal, preferably a mammal, more preferably a mouse, in which an endogenous gene has been altered by homologous recombination between the endogenous gene and an exogenous DNA molecule introduced into a cell of the animal, *e.g.*, an embryonic cell of the animal, prior to development of the animal.

Methods for generating transgenic animals via embryo manipulation and microinjection, particularly animals such as mice, have become conventional in the art and are described, for example, in U.S. Patent Nos. 4,736,866 and 4,870,009, U.S. Pat. NO: 4,873,191 and in Hogan, *Manipulating the Mouse Embryo* (Cold Spring Harbor Laboratory Press, Cold Spring Harbor, N.Y., 1986). Methods for constructing homologous recombination vectors and homologous recombinant animals are described further in Bradley, *Current Opinion in BioTechnology* 2:823-829 (1991) and in PCT Publication Nos. WO 90/11354, WO 91/01140, WO 92/0968, and WO 93/04169. Clones of the non-human transgenic animals described herein can also be produced according to the methods described in Wilmut *et al.*, *Nature* 385:810-813 (1997) and PCT Publication Nos. WO 97/07668 and WO 97/07669.

POLYPEPTIDES OF THE INVENTION

The present invention also pertains to isolated polypeptides encoded by KChIP1 nucleic acids ("KChIP1 polypeptides," or "KChIP1 proteins," such as the protein shown in SEQ ID NO: 2) and fragments and variants thereof, as well as polypeptides encoded by nucleotide sequences described herein (*e.g.*, other splicing variants). The term "polypeptide" refers to a polymer of amino acids, and not to a specific length; thus, peptides, oligopeptides and proteins are included within the definition of a polypeptide. As used herein, a polypeptide is said to be "isolated" or "purified" when it is substantially free of cellular material when it is isolated from recombinant and non-recombinant cells, or free of chemical precursors or other chemicals when it is chemically synthesized. A polypeptide, however, can be joined to another polypeptide with which it is not normally associated in a cell (*e.g.*, in a "fusion protein") and still be "isolated" or "purified."

The polypeptides of the invention can be purified to homogeneity. It is understood, however, that preparations in which the polypeptide is not purified to homogeneity are useful. The critical feature is that the preparation allows for the desired function of the polypeptide, even in the presence of considerable amounts of other components. Thus, the invention encompasses various degrees of purity. In one embodiment, the language "substantially free of cellular material" includes preparations of the polypeptide having less than about 30% (by dry weight) other proteins (*i.e.*, contaminating protein), less than about 20% other proteins, less than about 10% other proteins, or less than about 5% other proteins.

When a polypeptide is recombinantly produced, it can also be substantially free of culture medium, *i.e.*, culture medium represents less than about 20%, less than about 10%, or less than about 5% of the volume of the polypeptide preparation. The language "substantially free of chemical precursors or other chemicals" includes preparations of the polypeptide in which it is separated from chemical precursors or other chemicals that are involved in its synthesis. In one embodiment, the language "substantially free of chemical precursors or other chemicals" includes preparations of the polypeptide having less than about 30% (by dry weight) chemical precursors or other chemicals, less than about 20% chemical precursors or other chemicals, less

than about 10% chemical precursors or other chemicals, or less than about 5% chemical precursors or other chemicals.

In one embodiment, a polypeptide of the invention comprises an amino acid sequence encoded by a nucleic acid molecule comprising a nucleotide sequence of SEQ ID NO: 1, optionally additionally comprising one or more of SEQ ID NOs: 114-258; or the complement of such a nucleic acid, or portions thereof, or a portion or polymorphic variant thereof. However, the polypeptides of the invention also encompass fragment and sequence variants. Variants include a substantially homologous polypeptide encoded by the same genetic locus in an organism, *i.e.*, an allelic variant, as well as other splicing variants. Variants also encompass polypeptides derived from other genetic loci in an organism, but having substantial homology to a polypeptide encoded by a nucleic acid molecule comprising a nucleotide of SEQ ID NO: 1, optionally additionally one or more of SEQ ID NOs: 114-258; or a complement of such a sequence, or portions thereof or polymorphic variants thereof. Variants also include polypeptides substantially homologous or identical to these polypeptides but derived from another organism, *i.e.*, an ortholog. Variants also include polypeptides that are substantially homologous or identical to these polypeptides that are produced by chemical synthesis. Variants also include polypeptides that are substantially homologous or identical to these polypeptides that are produced by recombinant methods.

As used herein, two polypeptides (or a region of the polypeptides) are substantially homologous or identical when the amino acid sequences are at least about 45-55%, in certain embodiments at least about 70-75%, and in other embodiments at least about 80-85%, and in other embodiments greater than about 90% or more homologous or identical. A substantially homologous amino acid sequence, according to the present invention, will be encoded by a nucleic acid molecule hybridizing to of SEQ ID NO: 1 or any one of 114-258 or portion thereof, under stringent conditions as more particularly described above, or will be encoded by a nucleic acid molecule hybridizing to a nucleic acid sequence encoding SEQ ID NO: 1 or any one of 114-258 or a portion thereof or polymorphic variant thereof, under stringent conditions as more particularly described thereof.

The invention also encompasses polypeptides having a lower degree of identity but having sufficient similarity so as to perform one or more of the same functions performed by a polypeptide encoded by a nucleic acid molecule of the invention.

Similarity is determined by conserved amino acid substitution where a given amino acid in a polypeptide is substituted by another amino acid of like characteristics. Conservative substitutions are likely to be phenotypically silent. Typically seen as conservative substitutions are the replacements, one for another, among the aliphatic amino acids Ala, Val, Leu and Ile; interchange of the hydroxyl residues Ser and Thr, exchange of the acidic residues Asp and Glu, substitution between the amide residues Asn and Gln, exchange of the basic residues Lys and Arg and replacements among the aromatic residues Phe and Tyr. Guidance concerning which amino acid changes are likely to be phenotypically silent are found in Bowie *et al.*, *Science* 247:1306-1310 (1990).

A variant polypeptide can differ in amino acid sequence by one or more substitutions, deletions, insertions, inversions, fusions, and truncations or a combination of any of these. Further, variant polypeptides can be fully functional or can lack function in one or more activities. Fully functional variants typically contain only conservative variation or variation in non-critical residues or in non-critical regions. Functional variants can also contain substitution of similar amino acids that result in no change or an insignificant change in function. Alternatively, such substitutions may positively or negatively affect function to some degree. Non-functional variants typically contain one or more non-conservative amino acid substitutions, deletions, insertions, inversions, or truncation or a substitution, insertion, inversion, or deletion in a critical residue or critical region.

Amino acids that are essential for function can be identified by methods known in the art, such as site-directed mutagenesis or alanine-scanning mutagenesis (Cunningham *et al.*, *Science* 244:1082-1185 (1989)). The latter procedure introduces single alanine mutations at every residue in the molecule. The resulting mutant molecules are then tested for biological activity *in vitro*, or *in vitro* proliferative activity. Sites that are critical for polypeptide activity can also be determined by

structural analysis such as crystallization, nuclear magnetic resonance or photoaffinity labeling (Smith *et al.*, *J. Mol. Biol. 224*:899-904 (1992); de Vos *et al.*, *Science 255*:306-312 (1992)).

The invention also includes polypeptide fragments of the polypeptides of the invention. Fragments can be derived from a polypeptide encoded by a nucleic acid molecule comprising SEQ ID NO: 1 and optionally comprising one or more of SEQ ID NOs: 114-258; or a complement of such a nucleic acid or other variants. However, the invention also encompasses fragments of the variants of the polypeptides described herein. As used herein, a fragment comprises at least 6 contiguous amino acids. Useful fragments include those that retain one or more of the biological activities of the polypeptide as well as fragments that can be used as an immunogen to generate polypeptide-specific antibodies.

Biologically active fragments (peptides which are, for example, 6, 9, 12, 15, 16, 20, 30, 35, 36, 37, 38, 39, 40, 50, 100 or more amino acids in length) can comprise a domain, segment, or motif that has been identified by analysis of the polypeptide sequence using well-known methods, *e.g.*, signal peptides, extracellular domains, one or more transmembrane segments or loops, ligand binding regions, zinc finger domains, DNA binding domains, acylation sites, glycosylation sites, or phosphorylation sites.

Fragments can be discrete (not fused to other amino acids or polypeptides) or can be within a larger polypeptide. Further, several fragments can be comprised within a single larger polypeptide. In one embodiment a fragment designed for expression in a host can have heterologous pre- and pro-polypeptide regions fused to the amino terminus of the polypeptide fragment and an additional region fused to the carboxyl terminus of the fragment.

The invention thus provides chimeric or fusion polypeptides. These comprise a polypeptide of the invention operatively linked to a heterologous protein or polypeptide having an amino acid sequence not substantially homologous to the polypeptide.

"Operatively linked" indicates that the polypeptide and the heterologous protein are fused in-frame. The heterologous protein can be fused to the N-terminus

or C-terminus of the polypeptide. In one embodiment the fusion polypeptide does not affect function of the polypeptide *per se*. For example, the fusion polypeptide can be a GST-fusion polypeptide in which the polypeptide sequences are fused to the C-terminus of the GST sequences. Other types of fusion polypeptides include, but are not limited to, enzymatic fusion polypeptides, for example beta-galactosidase fusions, yeast two-hybrid GAL fusions, poly-His fusions and Ig fusions. Such fusion polypeptides, particularly poly-His fusions, can facilitate the purification of recombinant polypeptide. In certain host cells (*e.g.*, mammalian host cells), expression and/or secretion of a polypeptide can be increased using a heterologous signal sequence. Therefore, in another embodiment, the fusion polypeptide contains a heterologous signal sequence at its N-terminus.

EP-A-O 464 533 discloses fusion proteins comprising various portions of immunoglobulin constant regions. The Fc is useful in therapy and diagnosis and thus results, for example, in improved pharmacokinetic properties (EP-A 0232 262). In drug discovery, for example, human proteins have been fused with Fc portions for the purpose of high-throughput screening assays to identify antagonists. Bennett *et al.*, *Journal of Molecular Recognition, 8*:52-58 (1995) and Johanson *et al.*, *The Journal of Biological Chemistry, 270*,16:9459-9471 (1995). Thus, this invention also encompasses soluble fusion polypeptides containing a polypeptide of the invention and various portions of the constant regions of heavy or light chains of immunoglobulins of various subclasses (IgG, IgM, IgA, IgE).

A chimeric or fusion polypeptide can be produced by standard recombinant DNA techniques. For example, DNA fragments coding for the different polypeptide sequences are ligated together in-frame in accordance with conventional techniques. In another embodiment, the fusion gene can be synthesized by conventional techniques including automated DNA synthesizers. Alternatively, PCR amplification of nucleic acid fragments can be carried out using anchor primers which give rise to complementary overhangs between two consecutive nucleic acid fragments which can subsequently be annealed and re-amplified to generate a chimeric nucleic acid sequence (see Ausubel *et al.*, *Current Protocols in Molecular Biology*, 1992).

Moreover, many expression vectors are commercially available that already encode a fusion moiety (*e.g.*, a GST protein). A nucleic acid molecule encoding a polypeptide of the invention can be cloned into such an expression vector such that the fusion moiety is linked in-frame to the polypeptide.

The isolated polypeptide can be purified from cells that naturally express it, can be purified from cells that have been altered to express it (recombinant), or synthesized using known protein synthesis methods. In one embodiment, the polypeptide is produced by recombinant DNA techniques. For example, a nucleic acid molecule encoding the polypeptide is cloned into an expression vector, the expression vector introduced into a host cell and the polypeptide expressed in the host cell. The polypeptide can then be isolated from the cells by an appropriate purification scheme using standard protein purification techniques.

The polypeptides of the present invention can be used to raise antibodies or to elicit an immune response. The polypeptides can also be used as a reagent, *e.g.*, a labeled reagent, in assays to quantitatively determine levels of the polypeptide or a molecule to which it binds (*e.g.*, a ligand) in biological fluids. The polypeptides can also be used as markers for cells or tissues in which the corresponding polypeptide is preferentially expressed, either constitutively, during tissue differentiation, or in a diseased state. The polypeptides can be used to isolate a corresponding binding agent, *e.g.*, ligand or receptor, such as, for example, in an interaction trap assay, and to screen for peptide or small molecule antagonists or agonists of the binding interaction.

ANTIBODIES OF THE INVENTION

Polyclonal antibodies and/or monoclonal antibodies that specifically bind one form of the gene product but not to the other form of the gene product are also provided. Antibodies are also provided which bind a portion of either the variant or the reference gene product that contains the polymorphic site or sites. The term "antibody" as used herein refers to immunoglobulin molecules and immunologically active portions of immunoglobulin molecules, *i.e.*, molecules that contain an antigen binding site that specifically bind an antigen. A molecule that specifically binds to a polypeptide of the invention is a molecule that binds to that polypeptide or a fragment

thereof, but does not substantially bind other molecules in a sample, *e.g.*, a biological sample, which naturally contains the polypeptide. Examples of immunologically active portions of immunoglobulin molecules include F(ab) and F(ab')$_2$ fragments which can be generated by treating the antibody with an enzyme such as pepsin. The invention provides polyclonal and monoclonal antibodies that bind to a polypeptide of the invention. The term "monoclonal antibody" or "monoclonal antibody composition", as used herein, refers to a population of antibody molecules that contain only one species of an antigen binding site capable of immunoreacting with a particular epitope of a polypeptide of the invention. A monoclonal antibody composition thus typically displays a single binding affinity for a particular polypeptide of the invention with which it immunoreacts.

Polyclonal antibodies can be prepared as described above by immunizing a suitable subject with a desired immunogen, *e.g.*, polypeptide of the invention or a fragment thereof. The antibody titer in the immunized subject can be monitored over time by standard techniques, such as with an enzyme linked immunosorbent assay (ELISA) using immobilized polypeptide. If desired, the antibody molecules directed against the polypeptide can be isolated from the mammal (*e.g.*, from the blood) and further purified by well-known techniques, such as protein A chromatography to obtain the IgG fraction. At an appropriate time after immunization, *e.g.*, when the antibody titers are highest, antibody-producing cells can be obtained from the subject and used to prepare monoclonal antibodies by standard techniques, such as the hybridoma technique originally described by Kohler and Milstein, *Nature* 256:495-497 (1975), the human B cell hybridoma technique (Kozbor *et al.*, *Immunol. Today* 4: 72 (1983)), the EBV-hybridoma technique (Cole *et al.*, *Monoclonal Antibodies and Cancer Therapy*, Alan R. Liss,1985, Inc., pp. 77-96) or trioma techniques. The technology for producing hybridomas is well known (see generally *Current Protocols in Immunology* (1994) Coligan *et al.*, (eds.) John Wiley & Sons, Inc., New York, NY). Briefly, an immortal cell line (typically a myeloma) is fused to lymphocytes (typically splenocytes) from a mammal immunized with an immunogen as described above, and the culture supernatants of the resulting hybridoma cells are screened to

identify a hybridoma producing a monoclonal antibody that binds a polypeptide of the invention.

Any of the many well known protocols used for fusing lymphocytes and immortalized cell lines can be applied for the purpose of generating a monoclonal antibody to a polypeptide of the invention (see, *e.g.*, *Current Protocols in Immunology, supra*; Galfre *et al.*, *Nature* 266:55052 (1977); R.H. Kenneth, in *Monoclonal Antibodies: A New Dimension In Biological Analyses*, Plenum Publishing Corp., New York, New York (1980); and Lerner, *Yale J. Biol. Med.* 54:387-402 (1981)). Moreover, the ordinarily skilled worker will appreciate that there are many variations of such methods that also would be useful.

Alternative to preparing monoclonal antibody-secreting hybridomas, a monoclonal antibody to a polypeptide of the invention can be identified and isolated by screening a recombinant combinatorial immunoglobulin library (*e.g.*, an antibody phage display library) with the polypeptide to thereby isolate immunoglobulin library members that bind the polypeptide. Kits for generating and screening phage display libraries are commercially available (*e.g.*, the Pharmacia *Recombinant Phage Antibody System*, Catalog NO: 27-9400-01; and the Stratagene *Surf*ZAP™ Phage Display Kit, Catalog NO: 240612). Additionally, examples of methods and reagents particularly amenable for use in generating and screening antibody display library can be found in, for example, U.S. Patent NO: 5,223,409; PCT Publication NO: WO 92/18619; PCT Publication NO: WO 91/17271; PCT Publication NO: WO 92/20791; PCT Publication NO: WO 92/15679; PCT Publication NO: WO 93/01288; PCT Publication NO: WO 92/01047; PCT Publication NO: WO 92/09690; PCT Publication NO: WO 90/02809; Fuchs *et al.*, *Bio/Technology* 9: 1370-1372 (1991); Hay *et al.*, *Hum. Antibod. Hybridomas* 3:81-85 (1992); Huse *et al.*, *Science* 246: 1275-1281 (1989); and Griffiths *et al.*, *EMBO J.* 12:725-734 (1993).

Additionally, recombinant antibodies, such as chimeric and humanized monoclonal antibodies, comprising both human and non-human portions, which can be made using standard recombinant DNA techniques, are within the scope of the invention. Such chimeric and humanized monoclonal antibodies can be produced by recombinant DNA techniques known in the art.

In general, antibodies of the invention (*e.g.*, a monoclonal antibody) can be used to isolate a polypeptide of the invention by standard techniques, such as affinity chromatography or immunoprecipitation. A polypeptide-specific antibody can facilitate the purification of natural polypeptide from cells and of recombinantly produced polypeptide expressed in host cells. Moreover, an antibody specific for a polypeptide of the invention can be used to detect the polypeptide (*e.g.*, in a cellular lysate, cell supernatant, or tissue sample) in order to evaluate the abundance and pattern of expression of the polypeptide. Antibodies can be used diagnostically to monitor protein levels in tissue as part of a clinical testing procedure, *e.g.*, to, for example, determine the efficacy of a given treatment regimen. The antibody can be coupled to a detectable substance to facilitate its detection. Examples of detectable substances include various enzymes, prosthetic groups, fluorescent materials, luminescent materials, bioluminescent materials, and radioactive materials. Examples of suitable enzymes include horseradish peroxidase, alkaline phosphatase, beta-galactosidase, or acetylcholinesterase; examples of suitable prosthetic group complexes include streptavidin/biotin and avidin/biotin; examples of suitable fluorescent materials include umbelliferone, fluorescein, fluorescein isothiocyanate, rhodamine, dichlorotriazinylamine fluorescein, dansyl chloride or phycoerythrin; an example of a luminescent material includes luminol; examples of bioluminescent materials include luciferase, luciferin, and aequorin, and examples of suitable radioactive material include ^{125}I, ^{131}I, ^{35}S or ^{3}H.

DIAGNOSTIC ASSAYS

The nucleic acids, probes, primers, polypeptides and antibodies described herein can be used in methods of diagnosis of Type II diabetes; of a susceptibility to Type II diabetes; or of a condition associated with a KChIP1 gene, as well as in kits (*e.g.*, useful for diagnosis of Type II diabetes; a susceptibility to Type II diabetes; or a condition associated with a KChIP1 gene). In one embodiment, the kit comprises primers which contain one or more of the SNP's identified in Table 10.

In one embodiment of the invention, diagnosis of a disease or condition associated with a KChIP1 gene (*e.g.*, diagnosis of Type II diabetes, or of a

susceptibility to Type II diabetes) is made by detecting a polymorphism in a KChIP1 nucleic acid as described herein. The polymorphism can be a change in a KChIP1 nucleic acid, such as the insertion or deletion of a single nucleotide, or of more than one nucleotide, resulting in a frame shift; the change of at least one nucleotide, resulting in a change in the encoded amino acid; the change of at least one nucleotide, resulting in the generation of a premature stop codon; the deletion of several nucleotides, resulting in a deletion of one or more amino acids encoded by the nucleotides; the insertion of one or several nucleotides, such as by unequal recombination or gene conversion, resulting in an interruption of the coding sequence of the gene; duplication of all or a part of the gene; transposition of all or a part of the gene; or rearrangement of all or a part of the gene. More than one such change may be present in a single gene. Such sequence changes cause a difference in the polypeptide encoded by a KChIP1 nucleic acid. For example, if the difference is a frame shift change, the frame shift can result in a change in the encoded amino acids, and/or can result in the generation of a premature stop codon, causing generation of a truncated polypeptide. Alternatively, a polymorphism associated with a disease or condition or a susceptibility to a disease or condition associated with a KChIP1 nucleic acid can be a synonymous alteration in one or more nucleotides (*i.e.*, an alteration that does not result in a change in the polypeptide encoded by a KChIP1 nucleic acid). Such a polymorphism may alter splicing sites, affect the stability or transport of mRNA, or otherwise affect the transcription or translation of the gene. A KChIP1 nucleic acid that has any of the changes or alterations described above is referred to herein as an "altered nucleic acid."

In a first method of diagnosing Type II diabetes or a susceptibility to Type II diabetes, or another disease or condition associated with a KChIP1 gene, hybridization methods, such as Southern analysis, Northern analysis, or *in situ* hybridizations, can be used (see *Current Protocols in Molecular Biology*, Ausubel, F. *et al.*, eds, John Wiley & Sons, including all supplements through 1999). For example, a biological sample (a "test sample") from a test subject (the "test individual") of genomic DNA, RNA, or cDNA, is obtained from an individual, such as an individual suspected of having, being susceptible to or predisposed for, or

carrying a defect for, the disease or condition, or the susceptibility to the disease or condition, associated with a KChIP1 gene (*e.g.*, Type II diabetes). The individual can be an adult, child, or fetus. The test sample can be from any source which contains genomic DNA, such as a blood sample, sample of amniotic fluid, sample of cerebrospinal fluid, or tissue sample from skin, muscle, buccal or conjunctival mucosa, placenta, gastrointestinal tract or other organs. A test sample of DNA from fetal cells or tissue can be obtained by appropriate methods, such as by amniocentesis or chorionic villus sampling. The DNA, RNA, or cDNA sample is then examined to determine whether a polymorphism in a KChIP1 nucleic acid is present, and/or to determine which splicing variant(s) encoded by the KChIP1 is present. The presence of the polymorphism or splicing variant(s) can be indicated by hybridization of the gene in the genomic DNA, RNA, or cDNA to a nucleic acid probe. A "nucleic acid probe", as used herein, can be a DNA probe or an RNA probe; the nucleic acid probe can contain, for example, at least one polymorphism in a KChIP1 nucleic acid (*e.g.*, as set forth in Table 10) and/or contain a nucleic acid encoding a particular splicing variant of a KChIP1 nucleic acid. The probe can be any of the nucleic acid molecules described above (*e.g.*, the gene or nucleic acid, a fragment, a vector comprising the gene or nucleic acid, a probe or primer, etc.).

To diagnose Type II diabetes, or a susceptibility to Type II diabetes, or another condition associated with a KChIP1 gene, a hybridization sample is formed by contacting the test sample containing a KChIP1 nucleic acid with at least one nucleic acid probe. A preferred probe for detecting mRNA or genomic DNA is a labeled nucleic acid probe capable of hybridizing to mRNA or genomic DNA sequences described herein. The nucleic acid probe can be, for example, a full-length nucleic acid molecule, or a portion thereof, such as an oligonucleotide of at least 15, 30, 50, 100, 250 or 500 nucleotides in length and sufficient to specifically hybridize under stringent conditions to appropriate mRNA or genomic DNA. For example, the nucleic acid probe can be all or a portion of one of SEQ ID NOs: 114-258 or the complement thereof, or a portion thereof. Other suitable probes for use in the diagnostic assays of the invention are described above (see *e.g.*, probes and primers discussed under the heading, "Nucleic Acids of the Invention").

The hybridization sample is maintained under conditions that are sufficient to allow specific hybridization of the nucleic acid probe to a KChIP1 nucleic acid. "Specific hybridization", as used herein, indicates exact hybridization (*e.g.*, with no mismatches). Specific hybridization can be performed under high stringency conditions or moderate stringency conditions, for example, as described above. In a particularly preferred embodiment, the hybridization conditions for specific hybridization are high stringency.

Specific hybridization, if present, is then detected using standard methods. If specific hybridization occurs between the nucleic acid probe and KChIP1 nucleic acid in the test sample, then the KChIP1 has the polymorphism, or is the splicing variant, that is present in the nucleic acid probe. More than one nucleic acid probe can also be used concurrently in this method. Specific hybridization of any one of the nucleic acid probes is indicative of a polymorphism in the KChIP1 nucleic acid, or of the presence of a particular splicing variant encoding the KChIP1 nucleic acid and is therefore diagnostic for a susceptibility to a disease or condition associated with a KChIP1 nucleic acid (*e.g.*, Type II diabetes).

In Northern analysis (see *Current Protocols in Molecular Biology*, Ausubel, F. *et al.*, eds., John Wiley & Sons, *supra*) the hybridization methods described above are used to identify the presence of a polymorphism or a particular splicing variant, associated with a susceptibility to a disease or condition associated with a KChIP1 gene (*e.g.*, Type II diabetes). For Northern analysis, a test sample of RNA is obtained from the individual by appropriate means. Specific hybridization of a nucleic acid probe, as described above, to RNA from the individual is indicative of a polymorphism in a KChIP1 nucleic acid, or of the presence of a particular splicing variant encoded by a KChIP1 nucleic acid and is therefore diagnostic for Type II diabetes or a susceptibility to Type II diabetes or a condition associated with a KChIP1 nucleic acid (*e.g.*, Type II diabetes).

For representative examples of use of nucleic acid probes, see, for example, U.S. Patents NO: 5,288,611 and 4,851,330.

Alternatively, a peptide nucleic acid (PNA) probe can be used instead of a nucleic acid probe in the hybridization methods described above. PNA is a DNA

mimic having a peptide-like, inorganic backbone, such as N-(2-aminoethyl)glycine units, with an organic base (A, G, C, T or U) attached to the glycine nitrogen via a methylene carbonyl linker (see, for example, Nielsen, P.E. *et al.*, *Bioconjugate Chemistry* 5, American Chemical Society, p. 1 (1994). The PNA probe can be designed to specifically hybridize to a gene having a polymorphism associated with a susceptibility to a disease or condition associated with a KChIP1 nucleic acid (*e.g.*, Type II diabetes). Hybridization of the PNA probe to a KChIP1 gene is diagnostic for Type II diabetes or a susceptibility to Type II diabetes or a condition associated with a KChIP1 nucleic acid.

In another method of the invention, alteration analysis by restriction digestion can be used to detect an altered gene, or genes containing a polymorphism(s), if the alteration (mutation) or polymorphism in the gene results in the creation or elimination of a restriction site. A test sample containing genomic DNA is obtained from the individual. Polymerase chain reaction (PCR) can be used to amplify a KChIP1 nucleic acid (and, if necessary, the flanking sequences) in the test sample of genomic DNA from the test individual. RFLP analysis is conducted as described (see *Current Protocols in Molecular Biology, supra*). The digestion pattern of the relevant DNA fragment indicates the presence or absence of the alteration or polymorphism in the KChIP1 nucleic acid, and therefore indicates the presence or absence of Type II diabetes or the susceptibility to a disease or condition associated with a KChIP1 nucleic acid.

Sequence analysis can also be used to detect specific polymorphisms in a KChIP1 nucleic acid. A test sample of DNA or RNA is obtained from the test individual. PCR or other appropriate methods can be used to amplify the gene or nucleic acid, and/or its flanking sequences, if desired. The sequence of a KChIP1 nucleic acid, or a fragment of the nucleic acid, or cDNA, or fragment of the cDNA, or mRNA, or fragment of the mRNA, is determined, using standard methods. The sequence of the nucleic acid, nucleic acid fragment, cDNA, cDNA fragment, mRNA, or mRNA fragment is compared with the known nucleic acid sequence of the gene or cDNA (*e.g.*, one or more of SEQ ID NOs:, 114-258 or a complement thereof) or

mRNA, as appropriate. The presence of a polymorphism in the KChIP1 indicates that the individual has Type II diabetes or a susceptibility to Type II diabetes.

Allele-specific oligonucleotides can also be used to detect the presence of a polymorphism in a KChIP1 nucleic acid, through the use of dot-blot hybridization of amplified oligonucleotides with allele-specific oligonucleotide (ASO) probes (see, for example, Saiki, R. *et al.*, *Nature* 324:163-166 (1986)). An "allele-specific oligonucleotide" (also referred to herein as an "allele-specific oligonucleotide probe") is an oligonucleotide of approximately 10-50 base pairs, preferably approximately 15-30 base pairs, that specifically hybridizes to a KChIP1 nucleic acid, and that contains a polymorphism associated with a susceptibility to a disease or condition associated with a KChIP1 nucleic acid. An allele-specific oligonucleotide probe that is specific for particular polymorphisms in a KChIP1 nucleic acid can be prepared, using standard methods (see *Current Protocols in Molecular Biology*, *supra*). To identify polymorphisms in the gene that are associated with a disease or condition associated with a KChIP1 nucleic acid or a susceptibility to a disease or condition associated with a KChIP1 nucleic acid a test sample of DNA is obtained from the individual. PCR can be used to amplify all or a fragment of a KChIP1 nucleic acid and its flanking sequences. The DNA containing the amplified KChIP1 nucleic acid (or fragment of the gene or nucleic acid) is dot-blotted, using standard methods (see *Current Protocols in Molecular Biology*, *supra*), and the blot is contacted with the oligonucleotide probe. The presence of specific hybridization of the probe to the amplified KChIP1 nucleic acid is then detected. Hybridization of an allele-specific oligonucleotide probe to DNA from the individual is indicative of a polymorphism in the KChIP1 nucleic acid, and is therefore indicative of a disease or condition associated with a KChIP1 nucleic acid or susceptibility to a disease or condition associated with a KChIP1 nucleic acid (*e.g.*, Type II diabetes).

The invention further provides allele-specific oligonucleotides that hybridize to the reference or variant allele of a gene or nucleic acid comprising a single nucleotide polymorphism or to the complement thereof. These oligonucleotides can be probes or primers.

An allele-specific primer hybridizes to a site on target DNA overlapping a polymorphism and only primes amplification of an allelic form to which the primer exhibits perfect complementarity. See Gibbs, *Nucleic Acid Res.* 17, 2427-2448 (1989). This primer is used in conjunction with a second primer, which hybridizes at a distal site. Amplification proceeds from the two primers, resulting in a detectable product, which indicates the particular allelic form is present. A control is usually performed with a second pair of primers, one of which shows a single base mismatch at the polymorphic site and the other of which exhibits perfect complementarity to a distal site. The single-base mismatch prevents amplification and no detectable product is formed. The method works best when the mismatch is included in the 3'-most position of the oligonucleotide aligned with the polymorphism because this position is most destabilizing to elongation from the primer (see, *e.g.*, WO 93/22456).

With the addition of such analogs as locked nucleic acids (LNAs), the size of primers and probes can be reduced to as few as 8 bases. LNAs are a novel class of bicyclic DNA analogs in which the 2' and 4' positions in the furanose ring are joined via an O-methylene (oxy-LNA), S-methylene (thio-LNA), or amino methylene (amino-LNA) moiety. Common to all of these LNA variants is an affinity toward complementary nucleic acids, which is by far the highest reported for a DNA analog. For example, particular all oxy-LNA nonamers have been shown to have melting temperatures of 64°C and 74°C when in complex with complementary DNA or RNA, respectively, as oposed to 28°C for both DNA and RNA for the corresponding DNA nonamer. Substantial increases in T_m are also obtained when LNA monomers are used in combination with standard DNA or RNA monomers. For primers and probes, depending on where the LNA monomers are included (*e.g.*, the 3' end, the 5'end, or in the middle), the T_m could be increased considerably.

In another embodiment, arrays of oligonucleotide probes that are complementary to target nucleic acid sequence segments from an individual, can be used to identify polymorphisms in a KChIP1 nucleic acid. For example, in one embodiment, an oligonucleotide array can be used. Oligonucleotide arrays typically comprise a plurality of different oligonucleotide probes that are coupled to a surface of a substrate in different known locations. These oligonucleotide arrays, also

described as "Genechips™," have been generally described in the art, for example, U.S. Pat. NO: 5,143,854 and PCT patent publication Nos. WO 90/15070 and 92/10092. These arrays can generally be produced using mechanical synthesis methods or light directed synthesis methods that incorporate a combination of photolithographic methods and solid phase oligonucleotide synthesis methods. See Fodor *et al.*, *Science* 251:767-777 (1991), Pirrung *et al.*, U.S. Pat. NO: 5,143,854 (see also PCT Application NO: WO 90/15070) and Fodor *et al.*, PCT Publication NO: WO 92/10092 and U.S. Pat. NO: 5,424,186, the entire teachings of each of which are incorporated by reference herein. Techniques for the synthesis of these arrays using mechanical synthesis methods are described in, *e.g.*, U.S. Pat. NO: 5,384,261; the entire teachings of which are incorporated by reference herein. In another example, linear arrays can be utilized.

Once an oligonucleotide array is prepared, a nucleic acid of interest is hybridized with the array and scanned for polymorphisms. Hybridization and scanning are generally carried out by methods described herein and also in, *e.g.*, published PCT Application Nos. WO 92/10092 and WO 95/11995, and U.S. Pat. NO: 5,424,186, the entire teachings of which are incorporated by reference herein. In brief, a target nucleic acid sequence that includes one or more previously identified polymorphic markers is amplified by well-known amplification techniques, *e.g.*, PCR. Typically, this involves the use of primer sequences that are complementary to the two strands of the target sequence both upstream and downstream from the polymorphism. Asymmetric PCR techniques may also be used. Amplified target, generally incorporating a label, is then hybridized with the array under appropriate conditions. Upon completion of hybridization and washing of the array, the array is scanned to determine the position on the array to which the target sequence hybridizes. The hybridization data obtained from the scan is typically in the form of fluorescence intensities as a function of location on the array.

Although primarily described in terms of a single detection block, *e.g.*, for detection of a single polymorphism, arrays can include multiple detection blocks, and thus be capable of analyzing multiple, specific polymorphisms. In alternative arrangements, it will generally be understood that detection blocks may be grouped

within a single array or in multiple, separate arrays so that varying, optimal conditions may be used during the hybridization of the target to the array. For example, it may often be desirable to provide for the detection of those polymorphisms that fall within G-C rich stretches of a genomic sequence, separately from those falling in A-T rich segments. This allows for the separate optimization of hybridization conditions for each situation.

Additional uses of oligonucleotide arrays for polymorphism detection can be found, for example, in U.S. Patents Nos. 5,858,659 and 5,837,832, the entire teachings of which are incorporated by reference herein. Other methods of nucleic acid analysis can be used to detect polymorphisms in a Type II diabetes gene or variants encoding by a Type II diabetes gene. Representative methods include direct manual sequencing (Church and Gilbert, *Proc. Natl. Acad. Sci. USA* 81:1991-1995 (1988); Sanger, F. *et al., Proc. Natl. Acad. Sci. USA* 74:5463-5467 (1977); Beavis *et al.,* U.S. Pat. NO: 5,288,644); automated fluorescent sequencing; single-stranded conformation polymorphism assays (SSCP); clamped denaturing gel electrophoresis (CDGE); denaturing gradient gel electrophoresis (DGGE) (Sheffield, V.C. *et al., Proc. Natl. Acad. Sci. USA* 86:232-236 (1989)), mobility shift analysis (Orita, M. *et al., Proc. Natl. Acad. Sci. USA* 86:2766-2770 (1989)), restriction enzyme analysis (Flavell *et al., Cell* 15:25 (1978); Geever, *et al., Proc. Natl. Acad. Sci. USA* 78:5081 (1981)); heteroduplex analysis; chemical mismatch cleavage (CMC) (Cotton *et al., Proc. Natl. Acad. Sci. USA* 85:4397-4401 (1985)); RNase protection assays (Myers, R.M. *et al., Science* 230:1242 (1985)); use of polypeptides which recognize nucleotide mismatches, such as *E. coli* mutS protein; allele-specific PCR, for example.

In one embodiment of the invention, diagnosis of a disease or condition associated with a KChIP1 nucleic acid (*e.g.,* Type II diabetes) or a susceptibility to a disease or condition associated with a KChIP1 nucleic acid (*e.g.,* Type II diabetes) can also be made by expression analysis by quantitative PCR (kinetic thermal cycling). This technique, utilizing TaqMan®, can be used to allow the identification of polymorphisms and whether a patient is homozygous or heterozygous. The technique can assess the presence of an alteration in the expression or composition of the

polypeptide encoded by a KChIP1 nucleic acid or splicing variants encoded by a KChIP1 nucleic acid. Further, the expression of the variants can be quantified as physically or functionally different.

In another embodiment of the invention, diagnosis of Type II diabetes or a susceptibility to Type II diabetes 9or a condition associated with a KChIP1 gene) can be made by examining expression and/or composition of a KChIP1 polypeptide, by a variety of methods, including enzyme linked immunosorbent assays (ELISAs), Western blots, immunoprecipitations and immunofluorescence. A test sample from an individual is assessed for the presence of an alteration in the expression and/or an alteration in composition of the polypeptide encoded by a KChIP1 nucleic acid, or for the presence of a particular variant encoded by a KChIP1 nucleic acid. An alteration in expression of a polypeptide encoded by a KChIP1 nucleic acid can be, for example, an alteration in the quantitative polypeptide expression (*i.e.*, the amount of polypeptide produced); an alteration in the composition of a polypeptide encoded by a KChIP1 nucleic acid is an alteration in the qualitative polypeptide expression (*e.g.*, expression of an altered KChIP1 polypeptide or of a different splicing variant). In a preferred embodiment, diagnosis of the disease or condition associated with KChIP1 nucleic acid or a susceptibility to a disease or condition associated with a KChIP1 nucleic acid is made by detecting a particular splicing variant encoded by that KChIP1 nucleic acid, or a particular pattern of splicing variants.

Both such alterations (quantitative and qualitative) can also be present. The term "alteration" in the polypeptide expression or composition, as used herein, refers to an alteration in expression or composition in a test sample, as compared with the expression or composition of polypeptide by a KChIP1 nucleic acid in a control sample. A control sample is a sample that corresponds to the test sample (*e.g.*, is from the same type of cells), and is from an individual who is not affected by a susceptibility to a disease or condition associated with a KChIP1 nucleic acid. An alteration in the expression or composition of the polypeptide in the test sample, as compared with the control sample, is indicative of a susceptibility to a disease or condition associated with a KChIP1 nucleic acid. Similarly, the presence of one or more different splicing variants in the test sample, or the presence of significantly

different amounts of different splicing variants in the test sample, as compared with the control sample, is indicative of a disease or condition associated with a KChIP1 nucleic acid or a susceptibility to a disease or condition associated with a KChIP1 nucleic acid. Various means of examining expression or composition of the polypeptide encoded by a KChIP1 nucleic acid can be used, including: spectroscopy, colorimetry, lectrophoresis, isoelectric focusing, and immunoassays (*e.g.*, David *et al.*, U.S. Pat. 4,376,110) such as immunoblotting (see also *Current Protocols in Molecular Biology*, particularly Chapter 10). For example, in one embodiment, an antibody capable of binding to the polypeptide (*e.g.*, as described above), preferably an antibody with a detectable label, can be used. Antibodies can be polyclonal, or more preferably, monoclonal. An intact antibody, or a fragment thereof (*e.g.*, Fab or $F(ab')_2$) can be used. The term "labeled", with regard to the probe or antibody, is intended to encompass direct labeling of the probe or antibody by coupling (*i.e.*, physically linking) a detectable substance to the probe or antibody, as well as indirect labeling of the probe or antibody by reactivity with another reagent that is directly labeled. Examples of indirect labeling include detection of a primary antibody using a fluorescently labeled secondary antibody and end-labeling of a DNA probe with biotin such that it can be detected with fluorescently labeled streptavidin.

Western blotting analysis, using an antibody as described above that specifically binds to a polypeptide encoded by an altered KChIP1 nucleic acid (*e.g.*, a KChIP1 nucleic acid having one or more alterations as shown in Table 10), or an antibody that specifically binds to a polypeptide encoded by a non-altered nucleic acid, or an antibody that specifically binds to a particular splicing variant encoded by a nucleic acid, can be used to identify the presence in a test sample of a particular splicing variant or of a polypeptide encoded by a polymorphic or altered KChIP1 nucleic acid, or the absence in a test sample of a particular splicing variant or of a polypeptide encoded by a non-polymorphic or non-altered nucleic acid. The presence of a polypeptide encoded by a polymorphic or altered nucleic acid, or the absence of a polypeptide encoded by a non-polymorphic or non-altered nucleic acid, is diagnostic for a disease or condition associated with a KChIP1 nucleic acid or a susceptibility to a disease or condition associated with a KChIP1 nucleic acid (*e.g.*, Type II diabetes),

as is the presence (or absence) of particular splicing variants encoded by the KChIP1 nucleic acid.

In one embodiment of this method, the level or amount of polypeptide encoded by a KChIP1 nucleic acid in a test sample is compared with the level or amount of the polypeptide encoded by the KChIP1 in a control sample. A level or amount of the polypeptide in the test sample that is higher or lower than the level or amount of the polypeptide in the control sample, such that the difference is statistically significant, is indicative of an alteration in the expression of the polypeptide encoded by the KChIP1 nucleic acid, and is diagnostic for a disease or condition associated with a KChIP1 nucleic acid or a susceptibility to a disease or condition associated with that KChIP1 nucleic acid (*e.g.*, Type II diabetes). Alternatively, the composition of the polypeptide encoded by a KChIP1 nucleic acid in a test sample is compared with the composition of the polypeptide encoded by the KChIP1 nucleic acid in a control sample (*e.g.*, the presence of different splicing variants). A difference in the composition of the polypeptide in the test sample, as compared with the composition of the polypeptide in the control sample, is diagnostic for a disease or condition associated with a KChIP1 nucleic acid or a susceptibility to a disease or condition associated with that KChIP1 nucleic acid (*e.g.*, Type II diabetes). In another embodiment, both the level or amount and the composition of the polypeptide can be assessed in the test sample and in the control sample. A difference in the amount or level of the polypeptide in the test sample, compared to the control sample; a difference in composition in the test sample, compared to the control sample; or both a difference in the amount or level, and a difference in the composition, is indicative of a disease or condition associated with a KChIP1 nucleic acid or a susceptibility to a disease or condition associated with that KChIP1 nucleic acid.

The invention further pertains to a method for the diagnosis or identification of a susceptibility to Type II diabetes in an individual, by identifying an at-risk haplotype (*e.g.*, a haplotype comprising a KChIP1 nucleic acid). The KChIP1-associated haplotypes, *e.g.*, those described in Table 2 and Table 5, describe a set of genetic markers ("alleles"). In a certain embodiment, the haplotype can comprise one

or more alleles, two or more alleles, three or more alleles, four or more alleles, or five or more alleles. The genetic markers are particular "alleles" at "polymorphic sites" associated with KChIP1. A nucleotide position at which more than one sequence is possible in a population (either a natural population or a synthetic population, *e.g.*, a library of synthetic molecules), is referred to herein as a "polymorphic site". Where a polymorphic site is a single nucleotide in length, the site is referred to as a single nucleotide polymorphism ("SNP"). For example, if at a particular chromosomal location, one member of a population has an adenine and another member of the population has a thymine at the same position, then this position is a polymorphic site, and, more specifically, the polymorphic site is a SNP. Polymorphic sites can allow for differences in sequences based on substitutions, insertions or deletions. Each version of the sequence with respect to the polymorphic site is referred to herein as an "allele" of the polymorphic site. Thus, in the previous example, the SNP allows for both an adenine allele and a thymine allele.

Typically, a reference sequence is referred to for a particular sequence. Alleles that differ from the reference are referred to as "variant" alleles. For example, the reference KChIP1 sequence is described herein by SEQ ID NO: 1. The term, "variant KChIP1", as used herein, refers to a sequence that differs from SEQ ID NO: 1, but is otherwise substantially similar. The genetic markers that make up the haplotypes described herein are KChIP1 variants. The variants of KChIP1 that are used to determine the haplotypes disclosed herein of the present invention are associated with Type II diabetes or a susceptibility to Type II diabetes.

Additional variants can include changes that affect a polypeptide, *e.g.*, the KChIP1 polypeptide. These sequence differences, when compared to a reference nucleotide sequence, can include the insertion or deletion of a single nucleotide, or of more than one nucleotide, resulting in a frame shift; the change of at least one nucleotide, resulting in a change in the encoded amino acid; the change of at least one nucleotide, resulting in the generation of a premature stop codon; the deletion of several nucleotides, resulting in a deletion of one or more amino acids encoded by the nucleotides; the insertion of one or several nucleotides, such as by unequal recombination or gene conversion, resulting in an interruption of the coding sequence

of a reading frame; duplication of all or a part of a sequence; transposition; or a rearrangement of a nucleotide sequence, as described in detail above. Such sequence changes alter the polypeptide encoded by a KChIP1 nucleic acid. For example, if the change in the nucleic acid sequence causes a frame shift, the frame shift can result in a change in the encoded amino acids, and/or can result in the generation of a premature stop codon, causing generation of a truncated polypeptide. Alternatively, a polymorphism associated with Type II diabetes or a susceptibility to Type II diabetes can be a synonymous change in one or more nucleotides (*i.e.*, a change that does not result in a change in the amino acid sequence). Such a polymorphism can, for example, alter splice sites, affect the stability or transport of mRNA, or otherwise affect the transcription or translation of the polypeptide. The polypeptide encoded by the reference nucleotide sequence is the "reference" polypeptide with a particular reference amino acid sequence, and polypeptides encoded by variant alleles are referred to as "variant" polypeptides with variant amino acid sequences.

Haplotypes are a combination of genetic markers, *e.g.*, particular alleles at polymorphic sites. The haplotypes described herein, *e.g.*, having markers such as those shown in Table 10, Table 11, Table 12 or Table 13, are found more frequently in individuals with Type II diabetes than in individuals without Type II diabetes. Therefore, these haplotypes have predictive value for detecting Type II diabetes or a susceptibility to Type II diabetes in an individual. The haplotypes described herein are a combination of various genetic markers, *e.g.*, SNPs and microsatellites. Therefore, detecting haplotypes can be accomplished by methods known in the art for detecting sequences at polymorphic sites, such as the methods described above.

HAPLOTYPE SCREENING

In the methods for the diagnosis and identification of susceptibility to Type II diabetes or Type II diabetes in an individual, an at-risk haplotype is identified. In one embodiment, the at-risk haplotype is one which confers a significant risk of Type II diabetes. In one embodiment, significance associated with a haplotype is measured by an odds ratio. In a further embodiment, the significance is measured by a percentage. In one embodiment, a significant risk is measured as an odds ratio of at

least about 1.2, including by not limited to: 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, and 1.9. In a further embodiment, an odds ratio of at least 1.2 is significant. In a further embodiment, an odds ratio of at least about 1.5 is significant. In a further embodiment, a significant increase in risk is at least about 1.7 is significant. In a further embodiment, a significant increase in risk is at least about 20%, including but not limited to about 25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65%, 70%, 75%, 80%, 85%, 90%, 95% and 98%. In a further embodiment, a significant increase in risk is at least about 50%. It is understood however, that identifying whether a risk is medically significant may also depend on a variety of factors, including the specific disease, the haplotype, and often, environmental factors.

The invention also pertains to methods of diagnosing Type II diabetes or a susceptibility to Type II diabetes in an individual, comprising screening for an at-risk haplotype in, or comprising portions of, the KChIP1gene, where the haplotype is more frequently present in an individual susceptible to Type II diabetes (affected), compared to the frequency of its presence in a healthy individual (control), and wherein the presence of the haplotype is indicative of Type II diabetes or susceptibility to Type II diabetes. Standard techniques for genotyping for the presence of SNPs and/or microsatellite markers can be used, such as fluorescent based techniques (Chen, *et al.*, *Genome Res. 9*, 492 (1999)), PCR, LCR, Nested PCR and other techniques for nucleic acid amplification. In a preferred embodiment, the method comprises assessing in an individual the presence or frequency of SNPs and/or microsatellites in, comprising portions of, the KChIP1gene, wherein an excess or higher frequency of the SNPs and/or microsatellites compared to a healthy control individual is indicative that the individual has Type II diabetes or is susceptible to Type II diabetes. See, for example, Tables 6, 7, 9, 11 and 13 (below) for SNPs and markers that can form haplotypes that can be used as screening tools. These markers and SNPs can be used to design diagnostic tests for determining Type II diabetes or a susceptibility to Type II diabetes. For example, an at-risk haplotype can include microsatellite markers and/or SNPs such as those set forth in Table 10, Table 11, Table 12 and/or Table 13. The presence of the haplotype is diagnostic of Type II diabetes or of a susceptibility to Type II diabetes. Haplotype analysis involves

defining a candidate susceptibility locus using LOD scores. The defined regions are then ultra-fine mapped with microsatellite markers with an average spacing between markers of less than 100kb. All usable microsatellite markers that found in public databases and mapped within that region can be used. In addition, microsatellite markers identified within the deCODE genetics sequence assembly of the human genome can be used.

The frequencies of haplotypes in the patient and the control groups using an expectation-maximization algorithm can be estimated (Dempster A. *et al.*, 1977. *J. R. Stat. Soc. B*, 39:1-389). An implementation of this algorithm that can handle missing genotypes and uncertainty with the phase can be used. Under the null hypothesis, the patients and the controls are assumed to have identical frequencies. Using a likelihood approach, an alternative hypothesis where a candidate at-risk-haplotype, which can include the markers described herein, is allowed to have a higher frequency in patients than controls, while the ratios of the frequencies of other haplotypes are assumed to be the same in both groups is tested. Likelihoods are maximized separately under both hypotheses and a corresponding 1-df likelihood ratio statistics is used to evaluate the statistic significance.

To look for at-risk-haplotypes in the 1-lod drop, for example, association of all possible combinations of genotyped markers is studied, provided those markers span a practical region. The combined patient and control groups can be randomly divided into two sets, equal in size to the original group of patients and controls. The haplotype analysis is then repeated and the most significant p-value registered is determined. This randomization scheme can be repeated, for example, over 100 times to construct an empirical distribution of p-values.

The at-risk haplotypes identified in Table 2 (haplotypes identified as A1, A2, A3, A4, A5, A6, B1, B2, B3, B4 and B5) or Table 5 (haplotypes identified as D1,D2, D3, D4 and D5) are associated with Type II diabetes or a susceptibility to Type II diabetes. In certain embodiments, a haplotype associated with Type II diabetes or a susceptibility to Type II diabetes comprises markers DG5S879, DG5S881, D5S2075, DG5S883 and DG5S38 at the 5q35 locus; or DG5S1058 and DG5S37 at the 5q35 locus; or DG5S1058, DG5S37 and DG5S101 at the 5q35 locus; or DG5S881,

DG5S1058, D5S2075, DG5S883 and DG5S38 at the 5q35 locus; or DG5S879, DG5S1058 and DG5S37; or DG5S881, D5S2075, DG5S883 and DG5S38 at the 5q35 locus; DG5S953, DG5S955, DG5S13 and DG5S959 at the 5q35 locus; or DG5S888 and DG5S953 at the 5q35 locus; or DG5S953, DG5S955 and DG5S124 at the 5q35 locus; or DG5S888, DG5S44 and DG5S953 at the 5q35 locus; or DG5S953, DG5S955, DG5S13, DG5S123, and DG5S959 at the 5q35 locus. The presence of the haplotype is diagnostic of Type II diabetes or of a susceptibility to Type II diabetes. Also described herein is a haplotype associated with Type II diabetes or a susceptibility to Type II diabetes comprising markers DG5S13, KCP_1152, and D5S625 at the 5q35 locus; the presence of the haplotype is diagnostic of Type II diabetes or of a susceptibility to Type II diabetes. In one particular embodiment, the presence of the –4, 1, 0 haplotype at DG5S13, KCP_1152, and D5S625 is diagnostic of Type II diabetes or of a susceptibility to Type II diabetes. In another embodiment, a haplotype associated with Type II diabetes or a susceptibility to Type II diabetes in an individual, comprises markers DG5S124, KCP_1152, KCP_2649, KPC_4976 and KPC-16152 at the 5q35 locus. In one particular embodiment, the presence of the 0, 1, 1, 3 and 0 haplotype at DG5S124, KCP_1152, KCP_2649, KPC_4976 and KPC-16152 is diagnostic of Type II diabetes or of a susceptibility to Type II diabetes. In another embodiment, a haplotype associated with Type II diabetes or a susceptibility to Type II diabetes in an individual, comprises markers KCP_173982, KCP_15400, and KCP_18069. In one particular embodiment, the presence of the 0, 1, 1 haplotype at KCP_173982, KCP_15400, and KCP_18069 is diagnostic of Type II diabetes or of a susceptibility to Type II diabetes.

In additional embodiments, a haplotype associated with Type II diabetes or a susceptibility to Type II diabetes comprises markers DG5S124, KCP_1152, KCP_2649, KCP_4976, and KCP_16152 at the 5q35 locus, as well as one of the following 3 markers: KCP_197678, KCP_197775, and KCP_202795 at the 5q35 locus; the presence of the haplotype is diagnostic of Type II diabetes or of a susceptibility to Type II diabetes. In particular embodiments, the presence of the 0, 3, 1, 1, 3, 0 haplotype at DG5S124, KCP_197679, KCP_1152, KCP_2649, KCP_4976, and KCP_16152; the presence of the 0, 3, 1, 1, 3, 0 haplotype at DG5S124,

KCP_197775, KCP_1152, KCP_2649, KCP_4976, and KCP_16152; or the presence of the 0, 1, 1, 1, 3, 0 haplotype at DG5S124, KCP_202795, KCP_1152, KCP_2649, KCP_4976, and KCP_16152; is diagnostic of Type II diabetes or of a susceptibility to Type II diabetes.

Kits (*e.g.*, reagent kits) useful in the methods of diagnosis comprise components useful in any of the methods described herein, including for example, hybridization probes or primers as described herein (*e.g.*, labeled probes or primers), reagents for detection of labeled molecules, restriction enzymes (*e.g.*, for RFLP analysis), allele-specific oligonucleotides, antibodies which bind to altered or to non-altered (native) KChIP1 polypeptide, means for amplification of nucleic acids comprising a KChIP1 nucleic acid, or means for analyzing the nucleic acid sequence of a KChIP1 nucleic acid or for analyzing the amino acid sequence of a KChIP1 polypeptide as described herein, etc. In one embodiment, the kit for diagnosing a Type II diabetes or a susceptibility to Type II diabetes can comprise primers for nucleic acid amplification of a region in the KChIP1 nucleic acid comprising an at-risk haplotype that is more frequently present in an individual having Type II diabetes or who is susceptible to Type II diabetes. The primers can be designed using portions of the nucleic acids flanking SNPs that are indicative of Type II diabetes. In a certain embodiment, the primers are designed to amplify regions of the KChIP1 gene associated with an at-risk haplotype for Type II diabetes, as shown in Table 10 and 13, or more particularly the haplotypes described in Tables 2 and 5.

SCREENING ASSAYS AND AGENTS IDENTIFIED THEREBY

The invention provides methods (also referred to herein as "screening assays") for identifying the presence of a nucleotide that hybridizes to a nucleic acid of the invention, as well as for identifying the presence of a polypeptide encoded by a nucleic acid of the invention. In one embodiment, the presence (or absence) of a nucleic acid molecule of interest (*e.g.*, a nucleic acid that has significant homology with a nucleic acid of the invention) in a sample can be assessed by contacting the sample with a nucleic acid comprising a nucleic acid of the invention (*e.g.*, a nucleic acid having the sequence of one of SEQ ID NOs: 1, 114-258, or the complement

thereof, or a nucleic acid encoding an amino acid having the sequence of one of SEQ ID NOs: 2, or a fragment or variant of such nucleic acids), under stringent conditions as described above, and then assessing the sample for the presence (or absence) of hybridization. In one embodiment, high stringency conditions are conditions appropriate for selective hybridization. In another embodiment, a sample containing the nucleic acid molecule of interest is contacted with a nucleic acid containing a contiguous nucleotide sequence (*e.g.*, a primer or a probe as described above) that is at least partially complementary to a part of the nucleic acid molecule of interest (*e.g.*, a KChIP1 nucleic acid), and the contacted sample is assessed for the presence or absence of hybridization. In another embodiment, the nucleic acid containing a contiguous nucleotide sequence is completely complementary to a part of the nucleic acid molecule of interest.

In any of these embodiments, all or a portion of the nucleic acid of interest can be subjected to amplification prior to performing the hybridization.

In another embodiment, the presence (or absence) of a polypeptide of interest, such as a polypeptide of the invention or a fragment or variant thereof, in a sample can be assessed by contacting the sample with an antibody that specifically hybridizes to the polypeptide of interest (*e.g.*, an antibody such as those described above), and then assessing the sample for the presence (or absence) of binding of the antibody to the polypeptide of interest.

In another embodiment, the invention provides methods for identifying agents (*e.g.*, fusion proteins, polypeptides, peptidomimetics, prodrugs, receptors, binding agents, antibodies, small molecules or other drugs, or ribozymes) which alter (*e.g.*, increase or decrease) the activity of the polypeptides described herein, or which otherwise interact with the polypeptides herein. For example, such agents can be agents which bind to polypeptides described herein (*e.g.*, KChIP1 binding agents); which have a stimulatory or inhibitory effect on, for example, activity of polypeptides of the invention; or which change (*e.g.*, enhance or inhibit) the ability of the polypeptides of the invention to interact with KChIP1 binding agents (*e.g.*, receptors or other binding agents); or which alter posttranslational processing of the KChIP1 polypeptide (*e.g.*, agents that alter proteolytic processing to direct the polypeptide

from where it is normally synthesized to another location in the cell, such as the cell surface; agents that alter proteolytic processing such that more polypeptide is released from the cell, etc.

In one embodiment, the invention provides assays for screening candidate or test agents that bind to or modulate the activity of polypeptides described herein (or biologically active portion(s) thereof), as well as agents identifiable by the assays. Test agents can be obtained using any of the numerous approaches in combinatorial library methods known in the art, including: biological libraries; spatially addressable parallel solid phase or solution phase libraries; synthetic library methods requiring deconvolution; the 'one-bead one-compound' library method; and synthetic library methods using affinity chromatography selection. The biological library approach is limited to polypeptide libraries, while the other four approaches are applicable to polypeptide, non-peptide oligomer or small molecule libraries of compounds (Lam, K.S., *Anticancer Drug Des.* 12:145 (1997)).

In one embodiment, to identify agents which alter the activity of a KChIP1 polypeptide, a cell, cell lysate, or solution containing or expressing a KChIP1 polypeptide, or another splicing variant encoded by a KChIP1 gene (such as comprising a SNP as shown in Table 10 and/or 3), or a fragment or derivative thereof (as described above), can be contacted with an agent to be tested; alternatively, the polypeptide can be contacted directly with the agent to be tested. The level (amount) of KChIP1 activity is assessed (*e.g.*, the level (amount) of KChIP1 activity is measured, either directly or indirectly), and is compared with the level of activity in a control (*i.e.*, the level of activity of the KChIP1 polypeptide or active fragment or derivative thereof in the absence of the agent to be tested). If the level of the activity in the presence of the agent differs, by an amount that is statistically significant, from the level of the activity in the absence of the agent, then the agent is an agent that alters the activity of a KChIP1 polypeptide. An increase in the level of KChIP1 activity relative to a control, indicates that the agent is an agent that enhances (is an agonist of) KChIP1 activity. Similarly, a decrease in the level of KChIP1 activity relative to a control, indicates that the agent is an agent that inhibits (is an antagonist of) KChIP1 activity. In another embodiment, the level of activity of a KChIP1

polypeptide or derivative or fragment thereof in the presence of the agent to be tested, is compared with a control level that has previously been established. A level of the activity in the presence of the agent that differs from the control level by an amount that is statistically significant indicates that the agent alters KChIP1 activity.

The present invention also relates to an assay for identifying agents which alter the expression of a KChIP1 nucleic acid (*e.g.*, antisense nucleic acids, fusion proteins, polypeptides, peptidomimetics, prodrugs, receptors, binding agents, antibodies, small molecules or other drugs, or ribozymes) which alter (*e.g.*, increase or decrease) expression (*e.g.*, transcription or translation) of the gene or which otherwise interact with the nucleic acids described herein, as well as agents identifiable by the assays. For example, a solution containing a nucleic acid encoding a KChIP1 polypeptide (*e.g.*, a KChIP1 gene or nucleic acid) can be contacted with an agent to be tested. The solution can comprise, for example, cells containing the nucleic acid or cell lysate containing the nucleic acid; alternatively, the solution can be another solution that comprises elements necessary for transcription/translation of the nucleic acid. Cells not suspended in solution can also be employed, if desired. The level and/or pattern of KChIP1 expression (*e.g.*, the level and/or pattern of mRNA or of protein expressed, such as the level and/or pattern of different splicing variants) is assessed, and is compared with the level and/or pattern of expression in a control (*i.e.*, the level and/or pattern of the KChIP1 expression in the absence of the agent to be tested). If the level and/or pattern in the presence of the agent differs, by an amount or in a manner that is statistically significant, from the level and/or pattern in the absence of the agent, then the agent is an agent that alters the expression of a Type II diabetes gene. Enhancement of KChIP1 expression indicates that the agent is an agonist of KChIP1 activity. Similarly, inhibition of KChIP1 expression indicates that the agent is an antagonist of KChIP1 activity. In another embodiment, the level and/or pattern of KChIP1 polypeptide(s) (*e.g.*, different splicing variants) in the presence of the agent to be tested, is compared with a control level and/or pattern that have previously been established. A level and/or pattern in the presence of the agent that differs from the control level and/or pattern by an amount or in a manner that is statistically significant indicates that the agent alters KChIP1 expression.

In another embodiment of the invention, agents which alter the expression of a KChIP1 nucleic acid or which otherwise interact with the nucleic acids described herein, can be identified using a cell, cell lysate, or solution containing a nucleic acid encoding the promoter region of the KChIP1 gene or nucleic acid operably linked to a reporter gene. After contact with an agent to be tested, the level of expression of the reporter gene (*e.g.*, the level of mRNA or of protein expressed) is assessed, and is compared with the level of expression in a control (*i.e.*, the level of the expression of the reporter gene in the absence of the agent to be tested). If the level in the presence of the agent differs, by an amount or in a manner that is statistically significant, from the level in the absence of the agent, then the agent is an agent that alters the expression of the KChIP1, as indicated by its ability to alter expression of a gene that is operably linked to the KChIP1 gene promoter. Enhancement of the expression of the reporter indicates that the agent is an agonist of KChIP1 activity. Similarly, inhibition of the expression of the reporter indicates that the agent is an antagonist of KChIP1 activity. In another embodiment, the level of expression of the reporter in the presence of the agent to be tested is compared with a control level that has previously been established. A level in the presence of the agent that differs from the control level by an amount or in a manner that is statistically significant indicates that the agent alters expression.

Agents which alter the amounts of different splicing variants encoded by a KChIP1 nucleic acid (*e.g.*, an agent which enhances activity of a first splicing variant, and which inhibits activity of a second splicing variant), as well as agents which are agonists of activity of a first splicing variant and antagonists of activity of a second splicing variant, can easily be identified using these methods described above.

In other embodiments of the invention, assays can be used to assess the impact of a test agent on the activity of a polypeptide in relation to a KChIP1 binding agent. For example, a cell that expresses a compound that interacts with a KChIP1 polypeptide (herein referred to as a "KChIP1 binding agent", which can be a polypeptide or other molecule that interacts with a KChIP1 polypeptide, such as a receptor) is contacted with a KChIP1 in the presence of a test agent, and the ability of the test agent to alter the interaction between the KChIP1 and the KChIP1 binding

agent is determined. Alternatively, a cell lysate or a solution containing the KChIP1 binding agent, can be used. An agent which binds to the KChIP1 or the KChIP1 binding agent can alter the interaction by interfering with, or enhancing the ability of the KChIP1 to bind to, associate with, or otherwise interact with the KChIP1 binding agent. Determining the ability of the test agent to bind to a KChIP1 nucleic acid or a KChIP1 binding agent can be accomplished, for example, by coupling the test agent with a radioisotope or enzymatic label such that binding of the test agent to the polypeptide can be determined by detecting the labeled with ^{125}I, ^{35}S, ^{14}C or ^{3}H, either directly or indirectly, and the radioisotope detected by direct counting of radioemmission or by scintillation counting. Alternatively, test agents can be enzymatically labeled with, for example, horseradish peroxidase, alkaline phosphatase, or luciferase, and the enzymatic label detected by determination of conversion of an appropriate substrate to product. It is also within the scope of this invention to determine the ability of a test agent to interact with the polypeptide without the labeling of any of the interactants. For example, a microphysiometer can be used to detect the interaction of a test agent with a KChIP1 polypeptide or a KChIP1 binding agent without the labeling of either the test agent, KChIP1 polypeptide, or the KChIP1 binding agent. McConnell, H.M. *et al., Science* 257:1906-1912 (1992). As used herein, a "microphysiometer" (*e.g.*, Cytosensor™) is an analytical instrument that measures the rate at which a cell acidifies its environment using a light-addressable potentiometric sensor (LAPS). Changes in this acidification rate can be used as an indicator of the interaction between ligand and polypeptide.

Thus, these receptors can be used to screen for compounds that are agonists or antagonists, for use in treating a susceptibility to a disease or condition associated with a KChIP1 gene or nucleic acid, or for studying a susceptibility to a disease or condition associated with a KChIP1 (*e.g.*, Type II diabetes). Drugs could be designed to regulate KChIP1 activation that in turn can be used to regulate signaling pathways and transcription events of genes downstream.

In another embodiment of the invention, assays can be used to identify polypeptides that interact with one or more KChIP1 polypeptides, as described herein.

For example, a yeast two-hybrid system such as that described by Fields and Song (Fields, S. and Song, O., *Nature* 340:245-246 (1989)) can be used to identify polypeptides that interact with one or more KChIP1 polypeptides. In such a yeast two-hybrid system, vectors are constructed based on the flexibility of a transcription factor that has two functional domains (a DNA binding domain and a transcription activation domain). If the two domains are separated but fused to two different proteins that interact with one another, transcriptional activation can be achieved, and transcription of specific markers (*e.g.*, nutritional markers such as His and Ade, or color markers such as lacZ) can be used to identify the presence of interaction and transcriptional activation. For example, in the methods of the invention, a first vector is used which includes a nucleic acid encoding a DNA binding domain and also a KChIP1 polypeptide, splicing variant, or fragment or derivative thereof, and a second vector is used which includes a nucleic acid encoding a transcription activation domain and also a nucleic acid encoding a polypeptide which potentially may interact with the KChIP1 polypeptide, splicing variant, or fragment or derivative thereof (*e.g.*, a KChIP1 polypeptide binding agent or receptor). Incubation of yeast containing the first vector and the second vector under appropriate conditions (*e.g.*, mating conditions such as used in the Matchmaker™ system from Clontech (Palo Alto, California, USA)) allows identification of colonies that express the markers of interest. These colonies can be examined to identify the polypeptide(s) that interact with the KChIP1 polypeptide or fragment or derivative thereof. Such polypeptides may be useful as agents that alter the activity of expression of a KChIP1 polypeptide, as described above.

In more than one embodiment of the above assay methods of the present invention, it may be desirable to immobilize either the KChIP1 gene or nucleic acid, the KChIP1 polypeptide, the KChIP1 binding agent, or other components of the assay on a solid support, in order to facilitate separation of complexed from uncomplexed forms of one or both of the polypeptides, as well as to accommodate automation of the assay. Binding of a test agent to the polypeptide, or interaction of the polypeptide with a binding agent in the presence and absence of a test agent, can be accomplished in any vessel suitable for containing the reactants. Examples of such vessels include

microtitre plates, test tubes, and micro-centrifuge tubes. In one embodiment, a fusion protein (*e.g.*, a glutathione-S-transferase fusion protein) can be provided which adds a domain that allows a KChIP1 nucleic acid, KChIP1 polypeptide, or a KChIP1 binding agent to be bound to a matrix or other solid support.

In another embodiment, modulators of expression of nucleic acid molecules of the invention are identified in a method wherein a cell, cell lysate, or solution containing a KChIP1 nucleic acid is contacted with a test agent and the expression of appropriate mRNA or polypeptide (*e.g.*, splicing variant(s)) in the cell, cell lysate, or solution, is determined. The level of expression of appropriate mRNA or polypeptide(s) in the presence of the test agent is compared to the level of expression of mRNA or polypeptide(s) in the absence of the test agent. The test agent can then be identified as a modulator of expression based on this comparison. For example, when expression of mRNA or polypeptide is greater (statistically significantly greater) in the presence of the test agent than in its absence, the test agent is identified as a stimulator or enhancer of the mRNA or polypeptide expression. Alternatively, when expression of the mRNA or polypeptide is less (statistically significantly less) in the presence of the test agent than in its absence, the test agent is identified as an inhibitor of the mRNA or polypeptide expression. The level of mRNA or polypeptide expression in the cells can be determined by methods described herein for detecting mRNA or polypeptide.

This invention further pertains to novel agents identified by the above-described screening assays. Accordingly, it is within the scope of this invention to further use an agent identified as described herein in an appropriate animal model. For example, an agent identified as described herein (*e.g.*, a test agent that is a modulating agent, an antisense nucleic acid molecule, a specific antibody, or a polypeptide-binding agent) can be used in an animal model to determine the efficacy, toxicity, or side effects of treatment with such an agent. Alternatively, an agent identified as described herein can be used in an animal model to determine the mechanism of action of such an agent.

Furthermore, this invention pertains to uses of novel agents identified by the above-described screening assays for treatments as described herein. In addition, an

agent identified as described herein can be used to alter activity of a polypeptide encoded by a KChIP1 nucleic acid, or to alter expression of a KChIP1 nucleic acid, by contacting the polypeptide or the nucleic acid (or contacting a cell comprising the polypeptide or the nucleic acid) with the agent identified as described herein.

PHARMACEUTICAL COMPOSITIONS

The present invention also pertains to pharmaceutical compositions comprising nucleic acids described herein, particularly nucleotides encoding the polypeptides described herein (*e.g.*, a KChIP1 polypeptide); comprising polypeptides described herein and/or comprising other splicing variants encoded by a KChIP1 nucleic acid; and/or an agent that alters (*e.g.*, enhances or inhibits) KChIP1 nucleic acid expression or KChIP1 polypeptide activity as described herein. For instance, a polypeptide, protein (*e.g.*, a KChIP1 nucleic acid receptor), an agent that alters KChIP1 nucleic acid expression, or a KChIP1 binding agent or binding partner, fragment, fusion protein or pro-drug thereof, or a nucleotide or nucleic acid construct (vector) comprising a nucleotide of the present invention, or an agent that alters KChIP1 polypeptide activity, can be formulated with a physiologically acceptable carrier or excipient to prepare a pharmaceutical composition. The carrier and composition can be sterile. The formulation should suit the mode of administration.

Suitable pharmaceutically acceptable carriers include but are not limited to water, salt solutions (*e.g.*, NaCl), saline, buffered saline, alcohols, glycerol, ethanol, gum arabic, vegetable oils, benzyl alcohols, polyethylene glycols, gelatin, carbohydrates such as lactose, amylose or starch, dextrose, magnesium stearate, talc, silicic acid, viscous paraffin, perfume oil, fatty acid esters, hydroxymethylcellulose, polyvinyl pyrolidone, etc., as well as combinations thereof. The pharmaceutical preparations can, if desired, be mixed with auxiliary agents, *e.g.*, lubricants, preservatives, stabilizers, wetting agents, emulsifiers, salts for influencing osmotic pressure, buffers, coloring, flavoring and/or aromatic substances and the like which do not deleteriously react with the active agents.

The composition, if desired, can also contain minor amounts of wetting or emulsifying agents, or pH buffering agents. The composition can be a liquid solution,

suspension, emulsion, tablet, pill, capsule, sustained release formulation, or powder. The composition can be formulated as a suppository, with traditional binders and carriers such as triglycerides. Oral formulation can include standard carriers such as pharmaceutical grades of mannitol, lactose, starch, magnesium stearate, polyvinyl pyrollidone, sodium saccharine, cellulose, magnesium carbonate, etc.

Methods of introduction of these compositions include, but are not limited to, intradermal, intramuscular, intraperitoneal, intraocular, intravenous, subcutaneous, topical, oral and intranasal. Other suitable methods of introduction can also include gene therapy (as described below), rechargeable or biodegradable devices, particle acceleration devises ("gene guns") and slow release polymeric devices. The pharmaceutical compositions of this invention can also be administered as part of a combinatorial therapy with other agents.

The composition can be formulated in accordance with the routine procedures as a pharmaceutical composition adapted for administration to human beings. For example, compositions for intravenous administration typically are solutions in sterile isotonic aqueous buffer. Where necessary, the composition may also include a solubilizing agent and a local anesthetic to ease pain at the site of the injection. Generally, the ingredients are supplied either separately or mixed together in unit dosage form, for example, as a dry lyophilized powder or water free concentrate in a hermetically sealed container such as an ampule or sachette indicating the quantity of active agent. Where the composition is to be administered by infusion, it can be dispensed with an infusion bottle containing sterile pharmaceutical grade water, saline or dextrose/water. Where the composition is administered by injection, an ampule of sterile water for injection or saline can be provided so that the ingredients may be mixed prior to administration.

For topical application, nonsprayable forms, viscous to semi-solid or solid forms comprising a carrier compatible with topical application and having a dynamic viscosity preferably greater than water, can be employed. Suitable formulations include but are not limited to solutions, suspensions, emulsions, creams, ointments, powders, enemas, lotions, sols, liniments, salves, aerosols, etc., which are, if desired, sterilized or mixed with auxiliary agents, *e.g.*, preservatives, stabilizers, wetting

agents, buffers or salts for influencing osmotic pressure, etc. The agent may be incorporated into a cosmetic formulation. For topical application, also suitable are sprayable aerosol preparations wherein the active ingredient, preferably in combination with a solid or liquid inert carrier material, is packaged in a squeeze bottle or in admixture with a pressurized volatile, normally gaseous propellant, *e.g.*, pressurized air.

Agents described herein can be formulated as neutral or salt forms. Pharmaceutically acceptable salts include those formed with free amino groups such as those derived from hydrochloric, phosphoric, acetic, oxalic, tartaric acids, etc., and those formed with free carboxyl groups such as those derived from sodium, potassium, ammonium, calcium, ferric hydroxides, isopropylamine, triethylamine, 2-ethylamino ethanol, histidine, procaine, etc.

The agents are administered in a therapeutically effective amount. The amount of agents which will be therapeutically effective in the treatment of a particular disorder or condition will depend on the nature of the disorder or condition, and can be determined by standard clinical techniques. In addition, *in vitro* or *in vivo* assays may optionally be employed to help identify optimal dosage ranges. The precise dose to be employed in the formulation will also depend on the route of administration, and the seriousness of the symptoms, and should be decided according to the judgment of a practitioner and each patient's circumstances. Effective doses may be extrapolated from dose-response curves derived from *in vitro* or animal model test systems.

The invention also provides a pharmaceutical pack or kit comprising one or more containers filled with one or more of the ingredients of the pharmaceutical compositions of the invention. Optionally associated with such container(s) can be a notice in the form prescribed by a governmental agency regulating the manufacture, use or sale of pharmaceuticals or biological products, which notice reflects approval by the agency of manufacture, use of sale for human administration. The pack or kit can be labeled with information regarding mode of administration, sequence of drug administration (*e.g.*, separately, sequentially or concurrently), or the like. The pack or kit may also include means for reminding the patient to take the therapy. The pack or

kit can be a single unit dosage of the combination therapy or it can be a plurality of unit dosages. In particular, the agents can be separated, mixed together in any combination, present in a single vial or tablet. Agents assembled in a blister pack or other dispensing means is preferred. For the purpose of this invention, unit dosage is intended to mean a dosage that is dependent on the individual pharmacodynamics of each agent and administered in FDA approved dosages in standard time courses.

METHODS OF THERAPY

The present invention also pertains to methods of treatment (prophylactic and/or therapeutic) for certain diseases and conditions associated with KChIP1. In particular, the invention relates to methods of treatment for Type II diabetes or a susceptibility to Type II diabetes, using a Type II diabetes therapeutic agent. A "Type II diabetes therapeutic agent" is an agent that alters (*e.g.*, enhances or inhibits) KChIP1 polypeptide activity and/or KChIP1 nucleic acid expression, as described herein (*e.g.*, a Type II diabetes nucleic acid agonist or antagonist). In certain embodiments, the Type II diabetes therapeutic agent alters activity and/or nucleic acid expression of KChIP1.

Type II diabetes therapeutic agents can alter KChIP1 polypeptide activity or nucleic acid expression by a variety of means, such as, for example, by providing additional KChIP1 polypeptide or by upregulating the transcription or translation of the KChIP1 nucleic acid; by altering posttranslational processing of the KChIP1 polypeptide; by altering transcription of KChIP1 splicing variants; or by interfering with KChIP1 polypeptide activity (*e.g.*, by binding to a KChIP1 polypeptide), or by binding to another polypeptide that interacts with KChIP1, by altering (*e.g.*, downregulating) the expression, transcription or translation of a KChIP1 nucleic acid, or by altering (*e.g.*, agonizing or antagonizing) activity.

Representative Type II diabetes therapeutic agents include the following:

nucleic acids or fragments or derivatives thereof described herein, particularly nucleotides encoding the polypeptides described herein and vectors comprising such nucleic acids (*e.g.*, a gene, cDNA, and/or mRNA, such as a

nucleic acid encoding a KChIP1 polypeptide or active fragment or derivative thereof, or an oligonucleotide; or a complement thereof, or fragments or derivatives thereof, and/or other splicing variants encoded by a Type II diabetes nucleic acid, or fragments or derivatives thereof);

polypeptides described herein and/ or splicing variants encoded by the KChIP1 nucleic acid or fragments or derivatives thereof;

other polypeptides (*e.g.*, KChIP1 receptors); KChIP1 binding agents; or agents that affect (*e.g.*, increase or decrease) activity,

antibodies, such as an antibody to an altered KChIP1 polypeptide, or an antibody to a non-altered KChIP1 polypeptide, or an antibody to a particular splicing variant encoded by a KChIP1 nucleic acid as described above;

peptidomimetics; fusion proteins or prodrugs thereof; ribozymes; other small molecules; and

other agents that alter (*e.g.*, enhance or inhibit) expression of a KChIP1 nucleic acid, or that regulate transcription of KChIP1 splicing variants (*e.g.*, agents that affect which splicing variants are expressed, or that affect the amount of each splicing variant that is expressed).

More than one Type II diabetes therapeutic agent can be used concurrently, if desired.

A Type II diabetes nucleic acid therapeutic agent that is a nucleic acid is used in the treatment of Type II diabetes or in the treatment for a susceptibility to Type II diabetes. The term, "treatment" as used herein, refers not only to ameliorating symptoms associated with the disease or condition, but also preventing or delaying the onset of the disease or condition, and also lessening the severity or frequency of symptoms of the disease or condition. The therapy is designed to alter (*e.g.*, inhibit or enhance), replace or supplement activity of a KChIP1 polypeptide in an individual.

For example, a Type II diabetes therapeutic agent can be administered in order to upregulate or increase the expression or availability of the KChIP1 nucleic acid or of specific splicing variants of KChIP1 nucleic acid, or, conversely, to downregulate or decrease the expression or availability of the KChIP1 nucleic acid or specific splicing variants of the KChIP1 nucleic acid. Upregulation or increasing expression or availability of a native KChIP1 gene or nucleic acid or of a particular splicing variant could interfere with or compensate for the expression or activity of a defective gene or another splicing variant; downregulation or decreasing expression or availability of a native KChIP1 gene or of a particular splicing variant could minimize the expression or activity of a defective gene or the particular splicing variant and thereby minimize the impact of the defective gene or the particular splicing variant.

The Type II diabetes therapeutic agent(s) are administered in a therapeutically effective amount (*i.e.*, an amount that is sufficient to treat the disease, such as by ameliorating symptoms associated with the disease, preventing or delaying the onset of the disease, and/or also lessening the severity or frequency of symptoms of the disease). The amount which will be therapeutically effective in the treatment of a particular individual's disorder or condition will depend on the symptoms and severity of the disease, and can be determined by standard clinical techniques. In addition, *in vitro* or *in vivo* assays may optionally be employed to help identify optimal dosage ranges. The precise dose to be employed in the formulation will also depend on the route of administration, and the seriousness of the disease or disorder, and should be decided according to the judgment of a practitioner and each patient's circumstances. Effective doses may be extrapolated from dose-response curves derived from *in vitro* or animal model test systems.

In one embodiment, a nucleic acid of the invention (*e.g.*, a nucleic acid encoding a KChIP1 polypeptide, such as one of SEQ ID NO: 1 or a complement thereof); or another nucleic acid that encodes a KChIP1 polypeptide or a splicing variant, derivative or fragment thereof (*e.g.*, comprising any one or more of SEQ ID NO: 114-258), can be used, either alone or in a pharmaceutical composition as described above. For example, a KChIP1 gene or nucleic acid or a cDNA encoding a KChIP1 polypeptide, either by itself or included within a vector, can be introduced

into cells (either *in vitro* or *in vivo*) such that the cells produce native KChIP1 polypeptide. If necessary, cells that have been transformed with the gene or cDNA or a vector comprising the gene, nucleic acid or cDNA can be introduced (or re-introduced) into an individual affected with the disease. Thus, cells which, in nature, lack native KChIP1 expression and activity, or have altered KChIP1 expression and activity, or have expression of a disease-associated KChIP1 splicing variant, can be engineered to express the KChIP1 polypeptide or an active fragment of the KChIP1 polypeptide (or a different variant of the KChIP1 polypeptide). In certain embodiments, nucleic acids encoding a KChIP1 polypeptide, or an active fragment or derivative thereof, can be introduced into an expression vector, such as a viral vector, and the vector can be introduced into appropriate cells in an animal. Other gene transfer systems, including viral and nonviral transfer systems, can be used. Alternatively, nonviral gene transfer methods, such as calcium phosphate coprecipitation, mechanical techniques (*e.g.*, microinjection); membrane fusion-mediated transfer via liposomes; or direct DNA uptake, can also be used.

Alternatively, in another embodiment of the invention, a nucleic acid of the invention; a nucleic acid complementary to a nucleic acid of the invention; or a portion of such a nucleic acid (*e.g.*, an oligonucleotide as described below), can be used in "antisense" therapy, in which a nucleic acid (*e.g.*, an oligonucleotide) which specifically hybridizes to the mRNA and/or genomic DNA of a Type II diabetes gene is administered or generated *in situ*. The antisense nucleic acid that specifically hybridizes to the mRNA and/or DNA inhibits expression of the KChIP1 polypeptide, *e.g.*, by inhibiting translation and/or transcription. Binding of the antisense nucleic acid can be by conventional base pair complementarity, or, for example, in the case of binding to DNA duplexes, through specific interaction in the major groove of the double helix.

An antisense construct of the present invention can be delivered, for example, as an expression plasmid as described above. When the plasmid is transcribed in the cell, it produces RNA that is complementary to a portion of the mRNA and/or DNA which encodes the KChIP1 polypeptide. Alternatively, the antisense construct can be an oligonucleotide probe that is generated *ex vivo* and introduced into cells; it then

inhibits expression by hybridizing with the mRNA and/or genomic DNA of the polypeptide. In one embodiment, the oligonucleotide probes are modified oligonucleotides, which are resistant to endogenous nucleases, *e.g.*, exonucleases and/or endonucleases, thereby rendering them stable *in vivo*. Exemplary nucleic acid molecules for use as antisense oligonucleotides are phosphoramidate, phosphothioate and methylphosphonate analogs of DNA (see also U.S. Pat. Nos. 5,176,996; 5,264,564; and 5,256,775). Additionally, general approaches to constructing oligomers useful in antisense therapy are also described, for example, by Van der Krol *et al.*, (*BioTechniques* 6:958-976 (1988)); and Stein *et al.*, (*Cancer Res.* 48:2659-2668 (1988)). With respect to antisense DNA, oligodeoxyribonucleotides derived from the translation initiation site are preferred.

To perform antisense therapy, oligonucleotides (mRNA, cDNA or DNA) are designed that are complementary to mRNA encoding the KChIP1. The antisense oligonucleotides bind to KChIP1 mRNA transcripts and prevent translation. Absolute complementarity, although preferred, is not required. A sequence "complementary" to a portion of an RNA, as referred to herein, indicates that a sequence has sufficient complementarity to be able to hybridize with the RNA, forming a stable duplex; in the case of double-stranded antisense nucleic acids, a single strand of the duplex DNA may thus be tested, or triplex formation may be assayed. The ability to hybridize will depend on both the degree of complementarity and the length of the antisense nucleic acid, as described in detail above. Generally, the longer the hybridizing nucleic acid, the more base mismatches with an RNA it may contain and still form a stable duplex (or triplex, as the case may be). One skilled in the art can ascertain a tolerable degree of mismatch by use of standard procedures.

The oligonucleotides used in antisense therapy can be DNA, RNA, or chimeric mixtures or derivatives or modified versions thereof, single-stranded or double-stranded. The oligonucleotides can be modified at the base moiety, sugar moiety, or phosphate backbone, for example, to improve stability of the molecule, hybridization, etc. The oligonucleotides can include other appended groups such as peptides (*e.g.* for targeting host cell receptors *in vivo*), or agents facilitating transport across the cell membrane (see, *e.g.*, Letsinger *et al.*, *Proc. Natl. Acad. Sci. USA*

86:6553-6556 (1989); Lemaitre *et al.*, *Proc. Natl. Acad. Sci. USA* 84:648-652 (1987); PCT International Publication NO: WO 88/09810) or the blood-brain barrier (see, *e.g.*, PCT International Publication NO: WO 89/10134), or hybridization-triggered cleavage agents (see, *e.g.*, Krol *et al.*, *BioTechniques* 6:958-976 (1988)) or intercalating agents. (See, *e.g.*, Zon, Pharm. Res. 5:539-549 (1988)). To this end, the oligonucleotide may be conjugated to another molecule (*e.g.*, a peptide, hybridization triggered cross-linking agent, transport agent, hybridization-triggered cleavage agent).

The antisense molecules are delivered to cells that express KChIP1 *in vivo*. A number of methods can be used for delivering antisense DNA or RNA to cells; *e.g.*, antisense molecules can be injected directly into the tissue site, or modified antisense molecules, designed to target the desired cells (*e.g.*, antisense linked to peptides or antibodies that specifically bind receptors or antigens expressed on the target cell surface) can be administered systematically. Alternatively, in a preferred embodiment, a recombinant DNA construct is utilized in which the antisense oligonucleotide is placed under the control of a strong promoter (*e.g.*, pol III or pol II). The use of such a construct to transfect target cells in the patient results in the transcription of sufficient amounts of single stranded RNAs that will form complementary base pairs with the endogenous KChIP1 transcripts and thereby prevent translation of the KChIP1 mRNA. For example, a vector can be introduced *in vivo* such that it is taken up by a cell and directs the transcription of an antisense RNA. Such a vector can remain episomal or become chromosomally integrated, as long as it can be transcribed to produce the desired antisense RNA. Such vectors can be constructed by recombinant DNA technology methods standard in the art and described above. For example, a plasmid, cosmid, YAC or viral vector can be used to prepare the recombinant DNA construct that can be introduced directly into the tissue site. Alternatively, viral vectors can be used which selectively infect the desired tissue, in which case administration may be accomplished by another route (*e.g.*, systemically).

Endogenous KChIP1 polypeptide expression can also be reduced by inactivating or "knocking out" the gene, nucleic acid or its promoter using targeted homologous recombination (*e.g.*, see Smithies *et al.*, *Nature* 317:230-234 (1985);

Thomas & Capecchi, *Cell* 51:503-512 (1987); Thompson *et al.*, *Cell* 5:313-321 (1989)). For example, an altered, non-functional gene or nucleic acid (or a completely unrelated DNA sequence) flanked by DNA homologous to the endogenous gene or nucleic acid (either the coding regions or regulatory regions of the nucleic acid) can be used, with or without a selectable marker and/or a negative selectable marker, to transfect cells that express the gene or nucleic acid *in vivo*. Insertion of the DNA construct, via targeted homologous recombination, results in inactivation of the gene or nucleic acid. The recombinant DNA constructs can be directly administered or targeted to the required site *in vivo* using appropriate vectors, as described above. Alternatively, expression of non-altered genes or nucleic acids can be increased using a similar method: targeted homologous recombination can be used to insert a DNA construct comprising a non-altered functional gene or nucleic acid, *e.g.*, a nucleic acid comprising one or more of SEQ ID NOs: 114-258 or the complement thereof, or a portion thereof, in place of an altered KChIP1 in the cell, as described above. In another embodiment, targeted homologous recombination can be used to insert a DNA construct comprising a nucleic acid that encodes a Type II diabetes polypeptide variant that differs from that present in the cell.

Alternatively, endogenous KChIP1 nucleic acid expression can be reduced by targeting deoxyribonucleotide sequences complementary to the regulatory region of a KChIP1 nucleic acid (*i.e.*, the KChIP1 promoter and/or enhancers) to form triple helical structures that prevent transcription of the KChIP1 nucleic acid in target cells in the body. (See generally, Helene, C., *Anticancer Drug Des.*, 6(6):569-84 (1991); Helene, C. *et al.*, *Ann. N.Y. Acad. Sci.* 660:27-36 (1992); and Maher, L. J., *Bioassays* 14(12):807-15 (1992)). Likewise, the antisense constructs described herein, by antagonizing the normal biological activity of one of the KChIP1 proteins, can be used in the manipulation of tissue, *e.g.*, tissue differentiation, both *in vivo* and *for ex vivo* tissue cultures. Furthermore, the anti-sense techniques (*e.g.*, microinjection of antisense molecules, or transfection with plasmids whose transcripts are anti-sense with regard to a Type II diabetes gene mRNA or gene sequence) can be used to investigate the role of KChIP1 or the interaction of KChIP1 and its binding agents in developmental events, as well as the normal cellular function of KChIP1 or of the

interaction of KChIP1 and its binding agents in adult tissue. Such techniques can be utilized in cell culture, but can also be used in the creation of transgenic animals.

In yet another embodiment of the invention, other Type II diabetes therapeutic agents as described herein can also be used in the treatment or prevention of a susceptibility to a disease or condition associated with a Type II diabetes gene. The therapeutic agents can be delivered in a composition, as described above, or by themselves. They can be administered systemically, or can be targeted to a particular tissue. The therapeutic agents can be produced by a variety of means, including chemical synthesis; recombinant production; *in vivo* production (*e.g.*, a transgenic animal, such as U.S. Pat. NO: 4,873,316 to Meade *et al.*), for example, and can be isolated using standard means such as those described herein.

A combination of any of the above methods of treatment (*e.g.*, administration of non-altered polypeptide in conjunction with antisense therapy targeting altered mRNA of KChIP1; administration of a first splicing variant encoded by a KChIP1 nucleic acid in conjunction with antisense therapy targeting a second splicing encoded by a KChIP1 nucleic acid) can also be used.

The present invention is now illustrated by the following Exemplification, which is not intended to be limiting in any way. All references cited herein are incorporated by reference in their entirety.

EXEMPLIFICATION

The study was done in collaboration with the Icelandic Heart Association, who provided an encrypted list of 1350 diabetic patients. In 1967-1991 the Heart Association started a study of cardiovascular disease and its complications. Measurements of blood sugar were included in a thorough check-up of the participants which results led to many individuals being diagnosed with diabetes. The list of participants is an unbiased sample of about a third of the Icelandic nation. Individuals diagnosed in the years following 1991 were either diagnosed at the Icelandic Heart Association or at one of two major hospitals in Reykjavík, Iceland.

All participants in the Type II diabetes study visited the Icelandic Heart Association where each answered a questionnaire, had blood drawn, a blood sugar

assessment, and measurements taken. Height (m) and weight (kg) were measured to calculate the body mass index. In serum, the fasting blood glucose and triglyceride levels were measured as well. Diagnoses of Type II diabetes were based on the diagnostic criteria set by the World Health Organization (1999). All patients with fasting glucose above 7 mM were diagnosed as having Type II diabetes and individuals with fasting blood sugar between 6.1 – 6.9 mM were diagnosed with impaired fasting glucose. If the participants had no prior history of diabetes, they were requested to come in for another test to have their diagnosis confirmed. All individuals on diabetic medication were classified as Type II. The questionnaire included questions regarding age at diagnosis and type of medication. All patients were requested to bring two relatives who's DNA was used to confirm the genetotypes of the patients.

Since the patients had participated in a study that was conducted between 1967-1991 a considerable time had passed, in some instances, since they had visited the Heart Association. Therefore, all the patients were required to have another fasting blood glucose test to check on their blood sugar level at the time of participation in the study. Thus, all patients were labeled unconfirmed, meaning that results of blood glucose levels were pending, for this particular study. A label of confirmed diabetic was given to the patient when the measurements were received. Linkage analyses were done with confirmed patients and unconfirmed patients were included only if they were close relatives of a confirmed index patient. The initial list of patients included 1350 Type II diabetics, but during this study new patients were diagnosed who were relatives of the index patients. All participants with no previous history of diabetes but with elevated fasting glucose were diagnosed according to the WHO criteria as described above. At present date, 1406 Type II diabetics and 266 patients with impaired fasting glucose have participated in the study, together with 3972 of their close relatives.

This study was approved by the Data Protection Commission of Iceland and the National Bioethics Committee of Iceland. All patients and their relatives who participated in the Study gave informed consents.

Outline of the study

This particular genetic study, which has the aim of identifying a genetic variant or a gene that may contribute to type II diabetes by using a positional cloning approach, can be divided into three steps:

i. *Genome-wide linkage study*, where excess allele sharing among related type II diabetics is used to identify a chromosomal segment, typically 2 – 8 Megabases long, that may harbor a disease susceptibility gene/genes.

ii. *Locus-wide association study*, where a high-density of microsatellite markers is typed in a large patient and control cohort. By comparing the frequencies of individual alleles or haplotypes between the two cohorts, the location of the putative disease gene/genes is narrowed down to a few hundred kilobases.

iii. *Candidate gene assessment*, where additional microsatellites and/or SNPs are typed in all genes that are identified within the smaller candidate region and further association analysis is used to identify which of the genes shows strong association to the disease.

Linkage analysis

Pedigree Construction

For the linkage analysis, blood samples were obtained from 964 Type II diabetics and 203 individuals with impaired fasting glucose. The patients were clustered into families such that each patient is related to (within and including six meiotic events) at least one other patient. In this manner, 772 patients fell into families - 705 Type II diabetics and 67 with impaired fasting glucose. The confirmed Type II patients were treated as probands and clustered into families that each proband is related to, within and including six meiotic events. The other patients, unconfirmed Type II and IFG patients, were added to the families if they were related to a proband within and including three meiotic events. The rational behind this was to include as many patients as possible in the study. Impaired fasting glucose is an

immediate diagnosis, and we assumed that the more closely related these patients are to the confirmed diabetics, the likelier they are to have or to develop the disease.

The families were checked for relationship errors by comparing the identity-by state (IBS) distribution for the set of 906 markers, for each pair of related and genotyped individuals, to a reference distribution corresponding to the particular degree of relatedness. The reference distributions were constructed from a large subset of the Icelandic population. Individuals were excluded from the study if their relationship with the rest of the family was inconsistent with the relationship specified in the geneology databse.

The remaining material that was available for the study was the following: 763 now confirmed Type II patients in 227 families together with 764 genotyped relatives. Of the patients, 667 were confirmed Type II patients, 35 unconfirmed Type II patients, 52 confirmed patients with impaired fasting glucose (IFG) and 9 unconfirmed patients with IFG.

Stratification of the Patient Material

The patients were classified into two sub-phenotypes based on their BMI: non-obese Type II diabetes are patients who have BMI less than 30, and obese Type II diabetes are patients who have BMI at or above 30. The reason for fractionating the diabetics into non-obese and obese groups is that other factors may be influencing the pathogenesis of disease in these two groups. Obesity alone could be contributing to the diabetic phenotype. Therefore, this factor was separated. Obesity is most likely due to a combination of environmental and genetic factors. This fractionation into non-obese and obese diabetics practically separates the material into two halves; 60% of the patients are in the non-obese category (20% with BMI below 25 (lean) and 40% with BMI between 25-30 (overweight)), and 40% of the patients are in the obese category (BMI above 30).

An affected-only linkage analysis for each of those sub-phenotypes was performed, using the same set of families as above, but classifying patients not belonging to the particular sub-group as having an unknown disease status. Restricted to a particular sub-phenotype, some families no longer contain a pair of related

patients classified as affecteds and hence do not contribute in the linkage analysis. Such families were excluded from the analysis of the particular sub-phenotype. The number of patients and families used in the linkage analysis is summarized in Table 1 below.

Table 1: The number of patients and families that contribute to the genome-wide linkage scan, both when all the patients are used, and when the analysis is restricted to obese or non-obese diabetic patients, respectively.

Table 1: Phenotype and Patients

Phenotype	**Total Number of Patients**	**NO: of families contributing to the analysis**	**NO: of patients contributing to the analysis**
All diabetics	763	227	763
Obese	296	92	219
Non-obese	467	154	413

Genome wide scan

A genome wide scan was performed on 772 patients and their relatives. Nine patients were excluded due to inheritance errors so the linkage analysis was performed with 763 patients and 764 relatives. The procedure was as described in Gretarsdóttir, *et al.*, *Am J Hum Genet.*, 70(3):593-603 (2002). In short, the DNA was genotyped with a framework marker set of 906 microsatellite markers with an average resolution of 4cM. Alleles were called automatically with the TrueAllele program (Cybergenetics, Co., Pittsburgh, PA), and the program DecodeGT (deCODE genetics, ehf., Iceland), was used to fractionate according to quality and edit the called genotypes (Palsson, B., *et al.*, *Genome Res.*, 9(10):1002-1012 (1999)). The population allele frequencies for the markers were constructed from a cohort of more than 30,000 Icelanders that have participated in genome-wide studies of various disease projects at deCODE genetics. Additional markers were genotyped within the locus on chromosome 5q, where we observed the strongest linkage signal, to increase the information on identity by descent (IBD) sharing within the families. For those

markers, at least 180 Icelandic controls were genotyped to derive the population allele frequencies.

The additional microsatellite markers that were genotyped within the locus were either publicly available or designed at deCODE genetics; those markers are indicated with a DG designation. Repeats within the DNA sequence were identified that allowed us to choose or design primers that were evenly spaced across the locus. The identification of the repeats and location with respect to other markers was based on the work of the physical mapping team at deCODE genetics.

For the markers used in the genomewide scan, the genetic positions were taken from the recently published high-resolution genetic map (HRGM), constructed at deCODE genetics (Kong A., *et al., Nat Genet.,* 31: 241-247 (2002)). The genetic position of the additional markers are either taken from the HRGM, when available, or by applying the same genetic mapping methods as were used in constructing the HRGM map to the family material genotyped for this particular linkage study.

Statistical Methods for Linkage Analysis

The linkage analysis is done using the software Allegro (Gudbjartsson *et al., Nat. Genet.* 25:12-3, (2000)) that determines the statistical significance of excess sharing among related patients by applying non-parametric affected-only allele-sharing methods (without any particular disease inheritance model being specified). Allegro, a linkage program developed at deCODE genetics, calculates LOD scores based on multipoint calculations. Our baseline linkage analysis uses the S_{pairs} scoring function (Whittemore, A.S. and Halpern, J., *Biometrics* 50:118-27 (1994); Kruglyak L, *et al., Am J Hum Genet* 58:1347-63, (1996)), the exponential allele-sharing model (Kong, A. and Cox, N.J., *Am. J. Hum. Genet.*, 61:1179 (1997)), and a family weighting scheme which is halfway on a log scale between weighting each affected pair equally and weighting each family equally. In the analysis, all genotyped individuals who are not affected are treated as "unknown". Because of concern with small sample behavior, we usually compute corresponding P-values in two different ways for comparison. The first P-value is computed based on large sample theory; $Z_{lr} = \sqrt{(2 \log_e (10) \text{ LOD})}$ and is approximately distributed as a standard normal

distribution under the null hypothesis of no linkage. A second P-value is computed by comparing the observed LOD score to its complete data sampling distribution under the null hypothesis. When a data set consists of more than a handful of families, these two P-values tend to be very similar.

All suggestive loci with LOD scores greater than 2 are followed up with some extra markers to increase the information on the IBD-sharing within the families and to decrease the chance that a LOD score represents a false-positive linkage. The information measure we use was defined by Nicolae (D. L. Nicolae, Thesis, University of Chicago (1999)) and is a part of the Allegro program output. This measure is closely related to a classical measure of information as previously described by Dempster *et.al.* (Dempster, A.P., *et al.*, *J. R. Statist. Soc. B, 39*:1 (1977)); the information equals zero if the marker genotypes are completely uninformative and equals one if the genotypes determine the exact amount of allele sharing by descent among the affected relatives. Using the framework marker set with average marker spacing of 4 cM typically results in information content of about 0.7 in the families used in our linkage analysis. Increasing the marker density to one marker every centimorgan usually increases the information content above 0.85.

Results

The results of the genome-wide linkage analysis with the framework marker set are shown in FIG. 4 which depicts the allele-sharing LOD-score versus the genetic distance from the p-terminus in centimorgan (cM) for each of the 23 chromosomes. The analysis was performed with the three phenotypes: all Type II diabetics (solid lines), non-obese diabetics (dashed lines) and obese diabetics (dotted lines). A LOD-score of 1.84 is observed on chromosome 5q34-q35.2 with the framework marker set when we use all Type II diabetics in the analysis. When the linkage analysis is restricted to non-obese diabetics, this LOD-score increases to 2.81. The obese diabetics do not show linkage in this region.

Additional markers were genotyped in this area to increase the information content and to confirm the linkage. The information on the IBD-sharing at this locus was about 78% with the framework marker set. In order to increase the information

content, another 38 microsatellite markers were genotyped within a 40 cM region that includes the observed signal. Repeating the linkage analysis including the additional markers increased the LOD-score to 3.64 (P-value = 3.18×10^{-5}) for the non-obese diabetics. For all patients, the peak LOD-score increased to 2.9 (P-value = 1.22×10^{-4}). This is shown in FIG. 5.

The peak of the LOD-score is centered on marker D5S625 and the region determined by a drop of one in the LOD is from marker DG5S5 to marker D5S429, centromeric and telomeric respectively. The one-LOD-drop is about 9 cM and estimated to be about 3.5 Mb. This 1-LOD-drop roughly corresponds to the 80-90% confidence interval for the location of a putative disease associated gene.

Locus-wide association study

Genotyping to Narrow Down the Region of Linkage

In order to narrow down the region of interest, the linkage analysis is followed by a comprehensive association study of the 1-LOD-drop. This is necessary as the linkage analysis has limited resolution; it compares sharing among closely related individuals that share on average large chromosomal segments. For the association analysis, we identified a large number of additional microsatellite markers located in the 1-LOD-drop and typed those markers in both our patient cohort and in a large number of unrelated controls randomly selected from the Icelandic population.

We identified and typed 67 markers in the 1-LOD-drop in addition to the 17 markers already typed and used in the linkage analysis (locus-wide association micorsatellites; Table 6). The new polymorphic repeats (dinucleotide or trinucleotide repeats) were identified with the Sputnik program. We subtracted the smaller allele of CEPH sample 1347-02 (CEPH genomics repository) from the alleles of the microsatellites and used it as a reference. A total of 84 markers were available for the association analysis, *i.e.*, an average density of one marker every 42kb or one marker every 0.107 cM. All those markers were typed for 590 non-obese diabetics and 477 unrelated controls.

Statistical Methods for Association and Haplotype Analysis

For single marker association to the disease, we use Fisher exact test to calculate a two-sided P-value for each individual allele. When presenting the results, we use allelic frequencies rather than carrier frequencies for microsatellites, SNPs and haplotypes. Haplotype analyses are performed using a computer program we developed at deCODE called NEMO (NEsted MOdels) (Gretarsdóttir, *et al.*, *Nat Genet.* 2003 Oct;35(2):131-8). We use NEMO both to study marker-marker association and to calculate linkage disequilibrium (LD) between markers, and for case-control haplotype analysis. With NEMO, haplotype frequencies are estimated by maximum likelihood and the differences between patients and controls are tested using a generalized likelihood ratio test. The maximum likelihood estimates, likelihood ratios and P-values are computed with the aid of the EM-algorithm directly for the observed data, and hence the loss of information due to the uncertainty with phase and missing genotypes is automatically captured by the likelihood ratios, and under most situations, large sample theory can be used to reliably determine statistical significance. The relative risk (RR) of an allele or a haplotype, *i.e.*, the risk of an allele compared to all other alleles of the same marker, is calculated assuming the multiplicative model (Terwilliger, J.D. & Ott, J. A haplotype-based 'haplotype relative risk' approach to detecting allelic associations. *Hum Hered* 42, 337-46 (1992) and Falk, C.T. & Rubinstein, P. Haplotype relative risks: an easy reliable way to construct a proper control sample for risk calculations. *Ann Hum Genet* 51 (Pt 3), 227-33 (1987)), together with the population attributable risk (PAR).

In the haplotype analysis, it may be useful to group haplotypes together and test the group as a whole for association to the disease. This is possible to do with NEMO. A model is defined by a partition of the set of all possible haplotypes, where haplotypes in the same group are assumed to confer the same risk while haplotypes in different groups can confer different risks. A null hypothesis and an alternative hypothesis are said to be nested when the latter corresponds to a finer partition than the former. NEMO provides complete flexibility in the partition of the haplotype space. In this way, it is possible to test multiple haplotypes jointly for association and to test if different at-risk haplotypes confer different risk. As a measure of LD, we use

two standard definitions of LD, D′ and R^2 (Lewontin, R., *Genetics*, 49:49-67 (1964) and Hill, W.G. and A. Robertson, *Theor. Appl. Genet.*, 22:226-231 (1968)) as they provide complementary information on the amount of LD. For the purpose of estimating D′ and R^2, the frequencies of all two-marker allele combinations are estimated using maximum likelihood methods and the deviation from linkage disequilibrium is evaluated using a likelihood ratio test. The standard definitions of D′ and R^2 are extended to include microsatellites by averaging over the values for all possible allele combinations of the two markers weighted by the marginal allele probabilities.

The number of possible haplotypes that can be constructed out of the dense set of markers genotyped in the 1-LOD-drop is very large and even though the number of haplotypes that are actually observed in the patient and control cohort is much smaller, testing all those haplotypes for association to the disease is a formidable task Note that we do not restrict our analysis to haplotypes constructed from a set of consecutive markers, as some markers may be very mutable and might split up an otherwise well conserved haplotype constructed out of surrounding markers.

The approach we take to the problem of identifying those haplotypes in the candidate region that show strongest association to the disease is two-fold. First, we restrict the haplotypes we test to span a sub-region small enough that the included markers may be expected to be in substantial LD. In this study, we only consider haplotypes that span less than 300kb. Second, we apply an iterative procedure that gradually builds up the most significant haplotypes. Starting with haplotypes constructed out of 3 markers, we select those haplotypes that show strong association to the disease, add other nearby markers to those haplotypes and repeat the association test. By iterating this procedure, we expect to identify those haplotypes that show strongest association to the disease.

Results

For the association analysis, we genotyped 590 non-obese Icelandic Type II diabetes patients and 477 unrelated population controls using a total of 84 microsatellite markers. These markers are distributed evenly across a region of

approximately 3.5 Mb. The region is centered on our linkage peak and corresponds to the 1-LOD-drop. We then applied the procedure described above and looked for single-markers and haplotypes consisting of up to 5 markers that showed association to the disease. The result is summarized in FIG. 6. In FIG. 6, we show the location of a marker or a haplotype on the horizontal axis and the corresponding P-value from the associaton test on the vertical axis. This is shown for all haplotypes tested that have a P-value less than 0.01. The horizontal bars indicated the size of the corresponding haplotypes and the location of all markers is shown at the bottom of the figure. All locations are in Mb and refer to the NCBI Build33.

We observe a series of correlated haplotypes that show strong association for non-obese diabetics in two locations within the 1-LOD-drop. We denote those regions A (168.37 – 168.83Mb) and B (169.70 – 170.17Mb), and in Table 10 we list the most significant haplotype in each of those regions. For each haplotype, the table includes a two-sided single-test P-value for association, calculated using NEMO, the corresponding relative risk, the estimated frequency of the haplotype in the patient and the control cohorts, the region the haplotype spans, and the markers and alleles (in bold) that define the haplotype.

Note, however, that some of the haplotypes listed within each of the two regions are very correlated and should be considered as a single observation of association to the disease. This is demonstrated for region B in Table 3, which lists the pairwise correlation, both D′ and R^2, between the haplotypes. Based on the correlation, we observe that haplotypes B2 and B4 are strongly correlated and should be considered as a single observation of association to this region. Likewise, haplotypes B1 and B5 are strongly correlated. However, haplotypes B1, B2 and B3 are all weakly correlated with each other; and in fact, B1 and B2 are mutually exclusive, *i.e.,* never appear jointly on the same chromosome. These three haplotypes hence constitute three almost independent observations of association to non-obese diabetes of this region within the locus. It is possible to test haplotypes B1, B2 and B3 together as a group for association to non-obese diabetes. This test yields a P-value = 8.5×10^{-8} with a corresponding relative risk of 5.2, a population attributable

risk of 13.9%, and an allelic frequency of 0.089 and 0.018 in the patient and the control cohorts, respectively.

Table 2

	P-value	RR	Aff.frq	Ctrl.frq	Span (Mb)	Haplotype
A1	0.000005	> 10	0.033	0.000	168.37 - 168.72	**0** DG5S879 **4** DG5S881 **-4** D5S2075 **0** DG5S883 **4** DG5S38
A2	0.000006	3.81	0.053	0.015	168.55-168.77	**4** DG5S1058 **-6** DG5S37
A3	0.000008	3.64	0.054	0.015	168.55-168.83	**4** DG5S1058 **-6** DG5S37 **0** DG5S101
A4	0.000015	6.18	0.046	0.008	168.40-168.72	**4** DG5S881 **4** DG5S1058 **-4** D5S2075 **0** DG5S883 **4** DG5S38
A5	0.000015	4.42	0.047	0.011	168.37-168.77	**0** DG5S879 **4** DG5S1058 **-6** DG5S37
A6	0.000018	6.94	0.045	0.007	168.40-168.72	**4** DG5S881 **-4** D5S2075 **0** DG5S883 **4** DG5S38
B1	0.000011	> 10	0.039	0.000	169.87-170.17	**0** DG5S953 **0** DG5S955 **0** DG5S13 **5** DG5S959
B2	0.000023	> 10	0.034	0.000	169.65-169.87	**27** DG5S888 **0** DG5S953
B3	0.000023	5.26	0.049	0.010	169.87-170.04	**0** DG5S953 **0** DG5S955 **4** DG5S124
B4	0.000031	> 10	0.034	0.000	169.65-169.87	**27** DG5S888 **0** DG5S44 **0** DG5S953
B5	0.000060	> 10	0.034	0.000	169.87-170.17	**0** DG5S953 **0** DG5S955 **0** DG5S13 **0** DG5S123 **5** DG5S959

Table 2: Haplotypes within the 1-LOD-drop that show the strongest association to non-obese diabetes. For each haplotype, we show (*i*) a two-sided P-value for a single test of association to non-obese diabetes, (*ii*) the corresponding relative risk (RR), (*iii*) the estimated allelic frequency of the haplotype in the patient and the control cohort, (*iv*) the span of the haplotype (refering to NCBI 33) and (*v*) the alleles (in bold) and markers that define the haplotype. The haplotypes are separated into two groups, A and B, corresponding to two different regions within the 1-LOD-drop.

Table 3

		D′				
		B1	**B2**	**B3**	**B4**	**B5**
	B1	-	0	0	0	1
R2	**B2**	0	-	0.4	1	0
	B3	0	0.1	-	0.35	0
	B4	0	0.96	0.7	-	0
	B5	0.92	0	0	0	-

Table 3: Pairwise correlation between the five haplotypes in the B-region that show the strongest association to non-obese diabetes. Estimates of D′ are shown in the upper right corner, and estimates of R^2 are shown the the lower left corner. The haplotypes are labelled B1, …, B5 as in Table 2.

Investigation of Region B

Genes in Region B

We next identified all genes in and around region B (UCSC). In the region defined by the five most significant haplotypes, 169.70 – 170.17 Mb, there are four genes, *LCP2* (lymphocyte cytosolic protein 2), *KCNMB1* (potassium large conductance calcium-activated channel, subfamily M, beta member 1), *KChIP1*(Kv channel interacting protein 1) and *GABRP* (gamma-aminobutyric acid (GABA) A receptor, pi). Of those genes, *KChIP1* is by far the largest, stretching from 169.7 to 170.1 MB, or almost the entire span of the observed haplotype association. The other three genes are small. In addition, there is a big gene, *RANBP17* (RAN binding protein 17), just telomeric of the location of the observed association signal. The relative location of all the genes is shown in FIG. 7, which shows the location of the exons of *KCHIP1* as solid bars, and the location of the other genes as shaded boxes. In addition, FIG. 7 shows the location of the microsatellites (filled boxes) that we have typed in this region and the location of the at-risk haplotypes B1, …, B5 (gray horizontal lines).

Description of new Splice Variants of KChIP1 Identified by RACE and PCR

The published sequence for KChIP1 comprises exons 1 to 8. New exons belonging to the KChIP1 gene and four different splice variants were discovered by performing RACE or PCR (primers within the exons) using as template human Marathon cDNA and cDNA prepared from rat pancreatic INS1 beta cells. In all, 6 new exons located in the 5′ region of the gene were discovered.. An alternative exon 1 was found that we call exon 1a. Here, we label the published sequence for exon 1 with a "b" to distinguish it from the alternative exon 1, exon 1a. Four exons are called UTR 1, UTR 2, UTR 3 and UTR 4, or untranslated region 1 - 4, because they lie upstream of exon 1b and they are not translated. The last exon to be identified is called Ins-r, or insert rodent, because it was known to be present in mouse and rat, and has recently been demonstrated by others to be present in humans as well (Boland *et al., Am J Physiol Cell Physiol* 285, C161-170. (2003)). See nucleotide sequences of the new exons below, as well as their location in the genomic sequence of NCBI build 33. Even if not mentioned, all new variants of KChIP1 found and described below include exons 2 – 8 of the published sequence.

Splice variant 1 consists of exon 1a, UTR1, UTR2, UTR3, UTR4 and exon 1b. Exon 1a is untranslated and the resulting protein is identical in amino acid sequence to KChIP1 described by An *et al.* (*Nature* 430, 553-556 (2000), see also FIG.2). This variant was observed in human heart and testis and the rat INS1 cell line.

Splice variant 2 consists of exon 1b and the Ins-r exon giving rise to a protein that is identical in amino acid sequence to KChIP1 described by Boland *et al.*. This variant was observed in human brain, heart, pancreas and the rat INS1 cell line.

Splice variant 3 consists of exon 1a and is identical in nucleotide sequence to AL538404, an EST in NCBI. The amino acid sequence of the N-terminus coded by exon 1a is unique (see sequence below) but the amino acid sequence coded by exons 2 - 8 is that of the published sequence. This variant was observed in human brain, heart, pancreas, skeletal muscle, adipose tissue, liver, hypothalamus, small intestine, testis and the rat INS1 cell line.

Splice variant 4 consists of exons 1a and UTR1, which would result in a protein translated from exons 2 - 8. The second methionine in exon 2 has a Kozak sequence. This variant was observed in human heart.

The nucleotide sequences of the new exons are as follows (the genomic locations given are from NCBI build 33, see also Table 8):

Exon 1a: 169716298 – 169716511 (Build 33)
GGCTTCAGGGGTGCATCCGTCACTCAGGGTTCATTCACCCAGGCAGGCTCCAAGT
TCCTGGGGTGCACAAGGTGGGCACTGTCCCTTCTGGGTGCTGACAGCAGAGCCTG
GCTCCCCTCCGCCACCATGAGCGGCTGCTCCAAAAGATGCAAGCTTGGGTTCGTG
AAATTTGCCCAGACCATCTTTAAGCTCATCACTGGGACCCTCAGCAAAG (SEQ ID NO: 4)

UTR 1: 169848417-169848523 (Build 33)
ACTCAGCATCATCAAGACTGGAGGGACAGAGCATTTGAATCATCAGACGCTGGGC
CAGACGTCACCCCACGCGTTTTCTCATTTTATC GTCCTAAGAAGCCCAGAAG (SEQ ID NO: 5)

UTR 2: 169861083-169861154 (Build 33)
CCTGAATGCAATTTGCAATGAGGAGATGATTTGATTTTCTTCAGCCCTAGACCTCC
AGCTTCCTGAGAGCAG(SEQ ID NO: 6)

UTR 3: 169864589-169864679 (Build 33)
GGGTTCCCCAGGAGACCACGACAGAGGCCTGGAACCCAAGTTCTAATCCCACATC
CTGGCTGGGCAACTTCAGGCAAATTTCTAACACAAG (SEQ ID NO: 7)

UTR 4: 169867066-169867173 (Build 33)
GGTAGGGGAGGGGCCGGGCCCGGGGTCCCAACTCGCACTCAAGTCTTCGCTGCCA
TGGGGGCCGTCATGGGCACCTTCTCATCTCTGCaAACCAAACAAAGGCGACCC
(SEQ ID NO: 8)

Ins-r 170075401-170075433
ACATCGCCTGGTGGTATTACCAGTATCAGAGAG (SEQ ID NO: 9)

The nucleotide sequence derived from splice variant 4 (KChIP1.4) with the ATG and a Kozak sequence ((G/ANNATGG) underlined is as follows:

ATAAGATTGAAGATGAGCTGGAGATG<u>ACCATGG</u>TTTGCCATCGGCCCGAGGGACT
GGAGCAGCTCGAGGCCCAGACCAACTTCACCAAGAGGGAGCTGCAGGTCCTTTAT
CGAGGCTTCAAAAATGAGTGCCCCAGTGGTGTGGTCAACGAAGACACATTCAAGC
AGATCTATGCTCAGTTTTTCCCTCATGGAGATGCCAGCACGTATGCCCATTACCTC
TTCAATGCCTTCGACACCACTCAGACAGGCTCCGTGAAGTTCGAGGACTTTGTAAC
CGCTCTGTCGATTTTATTGAGAGGAACTGTCCACGAGAAACTAAGGTGGACATTT
AATTTGTATGACATCAACAAGGACGGATACATAAACAAAGAGGAGATGATGGAC
ATTGTCAAAGCCATCTATGACATGATGGGGAAATACACATATCCTGTGCTCAAAG
AGGACACTCCAAGGCAGCATGTGGACGTCTTCTTCCAGAAAATGGACAAAAATAA
AGATGGCATCGTAACTTTAGATGAATTTCTTGAATCATGTCAGGAGGACGACAAC
ATCATGAGGTCTCTCCAGCTGTTTCAAAATGTCATGTAACTGGTGACACTCAGCCA
TTCAGCTCTCAGAGACATTGTACTAAACAACCACCTTAACACCCTGATCTGCCCTT
GTTCTGATTTTACACACCAACTCTTGGGACAGAAACACCTTTTACACTTTGGAAGA

ATTCTCTGCTGAAGACTTTCTATGGAACCCAGCATCATGTGGCTCAGTCTCTGATT GCCAACTCTTCCYCTTTCTTCTTCTTGAGAGAGA (SEQ ID NO: 10)

The protein sequences resulting from the splice variants are as follows:

KChIP1.3
(The amino acid sequence derived from splice variant 3 (KChIP1.3), the underlined amino acids are coded by exon 1a.)
MSGCSKRCKLGFVKFAQTIFKLITGTLSKDKIEDELEMTMVCHRPEGLEQLEAQTNFTKRELQVLYRGFKNECPSGVVNEDTFKQIYAQFFPHGDASTYAHYLFNAFDTTQTGSVKFEDFVTALSILLRGTVHEKLRWTFNLYDINKDGYINKEEMMDIVKAIYDMMGKYTYPVLKEDTPRQHVDVFFQKMDKNKDGIVTLDEFLESCQEDDNIMRSLQLFQNVM (SEQ ID NO: 11)

KChIP1.2
(The amino acid sequence derived from splice variant 2 (KChIP1.2), the underlined amino acids are coded by exon Ins-r.)
MGAVMGTFSSLQTKQRRPSKDIAWWYYQYQRDKIEDELEMTMVCHRPEGLEQLEAQTNFTKRELQVLYRGFKNECPSGVVNEDTFKQIYAQFFPHGDASTYAHYLFNAFDTTQTGSVKFEDFVTALSILLRGTVHEKLRWTFNLYDINKDGYINKEEMMDIVKAIYDMMGKYTYPVLKEDTPRQHVDVFFQKMDKNKDGIVTLDEFLESCQEDDNIMRSLQLFQNVM (SEQ ID NO: 12)

KChIP1.4
(The amino acid sequence derived from splice variant 4 (KChIP1.4).)
MVCHRPEGLEQLEAQTNFTKRELQVLYRGFKNECPSGVVNEDTFKQIYAQFFPHGDASTYAHYLFNAFDTTQTGSVKFEDFVTALSILLRGTVHEKLRWTFNLYDINKDGYINKEEMMDIVKAIYDMMGKYTYPVLKEDTPRQHVDVFFQKMDKNKDGIVTLDEFLESCQEDDNIMRSLQLFQNVM (SEQ ID NO: 13)

Identification of SNPs and Microsatellites

In order to identify SNPs across KChIP1, all exons of KChIP1 and their flanking regions were sequenced on 94 non-obese diabetic patients. As a consequence, 31 SNPs were identified (Table 9). Additional SNPs were identified across the gene by selecting SNPs from the public domain (US National Center for Biotechnology Information's SNP database) and designing SNP assays for them. (Table 10).

We genotyped SNPs on 470 non-obese diabetics and 658 population-based controls using a method for detecting SNPs with fluorescent polarization template-directed dye-terminator incorporation (SNP-FP-TDI assay) (Chen, X., Zehnbauer, B., Gnirke, A. & Kwok, P.Y. *Proc. Natl. Acad. Sci. USA* 94, 10756-10761 (1997)).

Association Study of Genes in Region B

We tested all the genes in and around Region B (*LCP2, KCNMB1, KChIP1, GABRP* and *RANBP17)* individually for association to non-obese diabetes. In the analysis of each gene, we included all SNPs identified, and previously typed microsatellites, in and close to that gene. The association analysis was carried out in the same way as the locus-wide association, i.e., using the iterative approach, we search for haplotypes, shorter than 300kb, that showed strongest association to the disease.

The strongest association observed was for *KChIP1*. For *KChIP1*, we tested 25 markers, 7 microsatellites and 18 SNPs, for association (Table 11). The strongest association signal was observed in the 3′-end of the gene; a three marker haplotype with a P-value $= 9.2\times10^{-5}$, relative risk 12, and allelic frequency 3.6% and 0.3% in the patient and control cohorts, respectively. This haplotype, which extends over the last 8 exons of *KChIP1*, from 169.96 to 170.11 Mb, is listed in Table 4 as D1. We also observed another haplotype in the same region that showed association to non-obese diabetes, albeit less significant than D1, with a P-value = 0.037, relative risk 1.69 and allelic frequency 7.8% and 4.8% in the patient and the control cohorts, respectively. This haplotype is labelled D2 in Table 4. For risk haplotypes, the corresponding population attributable risk is PAR = 4.9% for D1 and PAR = 4.7% for D2. However, as D1 and D2 are independent haplotypes, i.e., they do not appear jointly on the same chromosome, their population attributable risk can be added together.

Table 4

	P-Value	RR	Aff.frq.	Ctrl.frq	Haplotype
Icelandic					
D1	9.20E-05	12	0.036	0.003	-4 DG5S13 C KCP_1152 0 D5S625
D2	0.037	1.69	0.078	0.048	0 DG5S124 C KCP_1152 C KCP_2649 T KCP_4976 A KCP_16152
Danish					
D1	0.052*	2.98	0.031	0.011	-4 DG5S13 C KCP_1152 0 D5S625
D2	0.002*	2.74	0.098	0.038	0 DG5S124 C KCP_1152 C KCP_2649 T KCP_4976 A KCP_16152

* One-sided P-value

Table 4: *Microsatellite* and SNP haplotype association within *KChIP1*. The two independent haplotypes D1 and D2 are located in the 3′-end of the gene, from 169.96 - 170.11 Mb. Shown are results of a test of association for non-obese diabetics vs population controls for both haplotypes in a cohort of Icelandic diabetics (top) and a replication in a cohort of Danish diabetics (bottom). Note that we report one-sided P-values for the test on the Danish cohort as that is a replication of association results previously observed in the Icelandic cohort.

Replication in a Cohort of Danish Diabetics

We typed the markers that define the two at-risk haplotypes, D1 and D2, in a cohort of 149 non-obese Danish females that have been diagnosed with diabetes and/or measured >7mM glucose who participated in a Danish PERF (Prospective Epidemiological Risk Factors) study. As controls, we used 346 females from the same study that answered no to a question about their diabetes status and/or measured <7mM glucose.

The results of the association test for the two at-risk haplotypes, identified in the Icelandic diabetes cohort, are listed in Table 4. Both haplotypes appear in higher frequency in the non-obese Danish diabetics than in the control cohort. For haplotype D1, the association to non-obese diabetes is only marginally significant, with a one-sided P-value = 0.05, and the relative risk of the at-risk haplotype is RR = 3.0, somewhat less than is observed for the Icelandic non-obese diabetics. Note, however, that the estimated frequency of haplotype D1 is very low, especially in the control cohorts, hence the estimates of the relative risk are not very reliable. For haplotype D2, on the other hand, we do observe a statistically significant association with a one-sided P-value = 0.002 and relative risk = 2.74. Note that as the test of association of haplotypes D1 and D2 are attempts to replicate the association we have observed for Icelandic non-obese diabetics, it is appropriate to report one-sided P-values for those tests.

Additional SNP Genotyping for KChIP1

Having observed association to the 3′-end of KChIP1, both in Icelandic and Danish non-obese diabetics, we subsequently sequenced 94 Icelandic individuals, 1/3 non-obese type II diabetes patients with the observed haplotype D1, 1/3 additional non-obese type II diabetes patients and 1/3 controls. The purpose of the sequencing

was to identify additional SNPs. We identified 725 SNPs (Table 12). Many of those SNPs were completely correlated so we removed several redundant SNPs from further genotyping. Some SNPs with very low minor allele frequencies were also ignored. Of the 725 identified SNPs plus what was originally identified, 108 were selected for further genotyping in the Icelandic cohort (Table 13).

We performed a single-marker test of association to non-obese diabetes for each of the additional SNPs we typed, although none of the SNPs showed a strong association. We did, however, observe that three of the SNPs, KCP_197678, KCP_197775 and KCP_202795, increased the specificity of haplotype D2, if added to that haplotype, while still retaining most of its sensitivity. This is shown in Table 5, both for the association in the Icelandic and in the Danish cohorts. This increases the value of the at-risk haplotype as a diagnostic tool. Note that the three SNPs are very correlated to each other, with pairwise correlation coefficients $D' \approx 0.96$ and $R^2 \approx 0.9$, hence the association of haplotypes D3, D4 and D5 to non-obese diabetes should be considered as a single observation.

In addition to the refinement of the at-risk haplotype D2, we observed another refinement of the at-risk haplotype, consisting of three SNPs only, that was very correlated with the three at-risk haplotoypes, D3, D4 and D5, with pairwise correlation coefficients $D' \approx 0.83$ and $R^2 \approx 0.59$, This haplotype is included in Table 5 as D6.

Table 5

	P-Value	RR	PAR	Aff.frq.	Ctrl.frq	Haplotype
Icelandic						
D2	0.037	1.69	6.3%	0.078	0.048	0 DG5S124 C KCP_1152 C KCP_2649 T KCP_4976 A KCP_16152
D3	0.022	2.19	5.5%	0.052	0.024	0 DG5S124 C KCP_1152 C KCP_2649 T KCP_4976 A KCP_16152 T KCP_197678
D4	0.052	2.03	4.6%	0.046	0.023	0 DG5S124 C KCP_1152 C KCP_2649 T KCP_4976 A KCP_16152 T KCP_197775
D5	0.023	2.14	5.5%	0.052	0.025	0 DG5S124 C KCP_1152 C KCP_2649 T KCP_4976 A KCP_16152 C KCP_202795
D6	0.054	1.77	4.0%	0.046	0.027	A KCP_173982 C KCP_15400 C KCP_18069
Danish						
D2	0.002*	2.74	12.0%	0.098	0.038	0 DG5S124 C KCP_1152 C KCP_2649 T KCP_4976 A KCP_16152
D3	0.0046*	2.60	9.0%	0.076	0.030	0 DG5S124 C KCP_1152 C KCP_2649 T KCP_4976 A KCP_16152 T KCP_197678
D4	0.0004*	3.69	11.3%	0.078	0.023	0 DG5S124 C KCP_1152 C KCP_2649 T KCP_4976 A KCP_16152 T KCP_197775
D5	0.0002*	3.67	11.7%	0.084	0.024	0 DG5S124 C KCP_1152 C KCP_2649 T KCP_4976 A KCP_16152 C KCP_202795

* One-sided P-value

Table 5: Microsatellite and SNP haplotype association within *KChIP1*. Shown is association of the at-risk haplotype D2, and of further refinements of that haplotype; haplotypes D3, D4 and D5, to non-obese diabetes. This is shown both for the Icelandic and the Danish cohorts and, as in Table 4, we report one-sided P-values for the association test in the Danish cohort. Finally, we include the result of association to non-obese diabetes, in the Icelandic cohort, of a 3 SNP haplotype, D6, that is strongly correlated with the at-risk haplotoypes D3, D4 and D5.

Allele Numbering System

SNP alleles are indicated by the letters found in the DNA sequence. In general the alleles can be references by A=0, C=1, G=2 and T=3. For microsatellite alleles, the CEPH sample (Centre d'Etudes du Polymorphisme Humain, genomics repository) is used as a reference, the lower allele of each microsatellite in this sample is set at 0 and all other alleles in other samples are numbered according in relation to this reference. Thus allele 1 is 1 bp longer than the lower allele in the CEPH sample, allele 2 is 2 bp longer than the lower allele in the CEPH sample, allele 3 is 3 bp longer than the lower allele in the CEPH sample, allele 4 is 4 bp longer than the lower allele

in the CEPH sample, allele -1 is 1 bp shorter than the lower allele in the CEPH sample, allele -2 is 2 bp shorter than the lower allele in the CEPH sample, and so on.

Table 6:

The DNA sequence of the microsatellites employed for the C05 locus wide association (including Build 33 locations).

Y= C or T; S = C or G; R = A or G; W = A or T; M = A or C; K = G or T.

TABLE 6

Name	Position	Nucleic Acid Sequence	SEQ ID NO:
DG5S5	167638990 - 167639163	TCCTCAGAACAGGTGCAACACAGTGTGTTTTGCTGGGG AAAAGGGATGTCAAGCAATCTATGACGGGGGTGCAGG GAGTCTGGGGAGAAACACAAGGAAGTGTGTGTGTGTG TGTGTGTGTGTGTGTGTGAATGTGTGTGTGTGTGAGAG AGAGAGCTGGTGTTTGTGTTCCA	SEQ ID NO: 14
D5S671	167657904 - 167658237	GGAATGTGCCAAGACATTCTTTAGGGTTGGTAACCAG AGACGCTATTTTGTCCTTGGTGGCTAAGAAATCACTTT TCTGACTGAAGGNCCATTTGACTTACTTCTTTTAAATT CAGGGGAATGGGTGGGCATCTCCATGATTCAGGTAAG GAAAAATCCAAGGNAAATAAACACACACACACACAC ACACACACACACACACACACACGGAGTAGAAATTTTTAG TGCAATTTTTTTGTCTCACAGCATTAATTAATTGCAGGG ATATAACTACCTTGGCAGAATTTTTTCTCCCCAACCCA CCACCCCCCCGGAATAAGTTTGGCTCTTTTCAGCT	SEQ ID NO: 15
DG5S870	167719773 - 167719939	TGCCCACTCATAAGATGCTGAGGTTACAACTGTTAATA AGATATTAAGATACTGTCTTTTTCTTCCTCTTTCTCTCT TACACACACACACACACACACACACACACACTTTTTG GGCCAACTGGAAATTCATACATTCTCCCCAGCACTGGA GCTCAAAGCGTCTG	SEQ ID NO: 16
D5S671	167657904 - 167658237	GGAATGTGCCAAGACATTCTTTAGGGTTGGTAACCAG AGACGCTATTTTGTCCTTGGTGGCTAAGAAATCACTTT TCTGACTGAAGGNCCATTTGACTTACTTCTTTTAAATT CAGGGGAATGGGTGGGCATCTCCATGATTCAGGTAAG GAAAAATCCAAGGNAAATAAACACACACACACACAC ACACACACACACACACACACACGGAGTAGAAATTTTTAG TGCAATTTTTTTGTCTCACAGCATTAATTAATTGCAGGG ATATAACTACCTTGGCAGAATTTTTTCTCCCCAACCCA CCACCCCCCCGGAATAAGTTTGGCTCTTTTCAGCT	SEQ ID NO: 17
DG5S870	167719773 - 167719939	TGCCCACTCATAAGATGCTGAGGTTACAACTGTTAATA AGATATTAAGATACTGTCTTTTTCTTCCTCTTTCTCTCT TACACACACACACACACACACACACACACACTTTTTG GGCCAACTGGAAATTCATACATTCTCCCCAGCACTGGA GCTCAAAGCGTCTG	SEQ ID NO: 18

DG5S85	167721558 - 167721918	TTGTTGTTGTTGGTGGTGGTGGGGTGTGTGTGTGTGTG TGTGTGTGTGTGTGTGTGTGTGTGTTCGAGACAGACTCTC ACTCTGTCACCCAGGCTGGAGTGCAGTGGCACGATCT GGGTTCACTGCAACCTCTACTTCCTCAGCTCCAAGGAT CCTCTCACCTCCACCTCCCAAGTAGCTGGGACTACAGG TACGCGCCACCATGTCTGGCTAATTTTTTTGTATTGGA GAGACAGGGTTCCACCATGTTGCCCGGGCTAGTGTTGC ACTCCTGAGCTCAGGTGATCCACCCACCTCAACGTCCC CAAGTGCTGGGATTAGAGGCGTGAGCCACCACGTCTG GCCTATACACTATAGAGTTT	SEQ ID NO: 19
DG5S90	167766290 - 167766502	TCTGGACAGGACCAGGAGTTGGCTGCTGTCAGCCTTTG CCCCACCTCTCTGTGGCTACTGGGTATGTGAATCTCTC AAGGCCTGAAGAGAGGACAGCTGAGGAATTTGGAAAT CCTAAAACACATGCATACACACACACACACACACACA CACACACACACACACACACTTTTCTTTCCCTTAAAAAA AAAAAGATTCATTCACCGTGTGCA	SEQ ID NO: 20
DG5S874	167846718 - 167847065	CTGTCTACACTACCCACCCATTAGTCACTTATTAGCCC TCTGAATTACTGGATTGAAAAAACATAGTATATATATA GGGCTTGGTACTATTCACGGTTTCAGGCATCCACTGAG GGGTGTTGCAATGTATCTCCCACGGATAAGGAAGGAC TGGTATATTAACACTTTTATTTGATTTACAAAATAAAG GATAGTTTATATAGTTCTGGGTAAAATTAATTAATTAA TTTAAAAGGAAAAAAGATAAAGGCAAACTTTAAGCTT GTTAAAAATTAAGTAAAATAATTTGGATTATTTAATTG GACAAAGAGGACTGGCTTTGCCAATGAAACAATATGG CCGACATG	SEQ ID NO: 21
DG5S88	167864864 - 167865059	GGACCTTCTTTCTGCCCTAAAACCGCAATATCATTATA ATAACAAATATATATATATATATATATATATTTTTTTTT TTTAAAACAATCTTGCTATGTTGCCTAGGCTGGTGTGG AACTCCTGGCCTCAAGTGATCCTCCCACCTCGGCCTCC CAGAGTGCTGGGATTATAGACATGAACTACCATACCC AGCCA	SEQ ID NO: 22
DG5S7	167910343 - 167910651	CACAGCCATCAAGTTTCCAACTTACTGCCTCACATATT AAGATGATTTTTTTAAACAAACTTAACAGGCGATGGAT ACTCCATTCTCCATGATGTGCTTAATTCACATGCATGC TTGTATCAAAACATCTCACATACTCCATAAAGCCTGTA ATCCCAACACTTTGGGATGCCAAGGTGGGTGGATCAC TTGAGCCCAGGAGTTTGAGAACAGCCTGGACAACATG GCGAAACCCCATTTACACACACACACACACACACACA CACACACACCACACAAACAAAATGAAACAAACACCTA ACCAACAA	SEQ ID NO: 23
DG5S6	167952553 - 167952858	TCCTAACGGCTGCTACCACTAAAGATCTTAGCATGGTG TGTGTGTGCGTGTGTGTGTGTGTGTGTGTGTGTGTGTG TGTGTGGTGGGGCTATTCAGTAAGGCTAGAAGTGAAA AAGCTAGTAGAAAGCCCATGGTGATGGAGAATGGAGG AAGACTGATTAGGGAGCTCCTCAGCAGTATAAGGAAG GACTAAGAGCACATAAGGACAGGATCATAGAATTCCG CATCTCAGGATTTTTGAGGCTGCCACTGCCTTAGCTGT GAGGCCAGTGCATATAAGAATAGTTTGCACAGTTCTG CTGTGG	SEQ ID NO: 24
DG5S87	167992779 - 167993149	CCTCTGGGATTAGCCTCTCAGGGTACAGATATAACGAT GATTGAGTTGGCTTATGTATGTGTGTGTTGTGTGTGTG TCTGTGTGTGTGTGTGAGAGAGAGAGAGAGAGAGAGA GAGAGAGTGACAGAGAGAGAATGAGAGAGAACTGGA AGTTGTCAACAAGAAGAGTCAAACTCTGTAAAATATT TGAAGAGATTTATTCTGAGCCAAATAGGAGTGCCACA	SEQ ID NO: 25

		GCCCCGGGAGATCCTAAGAACATGTGCCCAGAGTAGT CAAGCTATAGTTTGGTTTTATACATTTTAGGGAGACAT AAGACATCAGTCAATACATGTAAGATGCACATTGATA CACTGGTTTAGTAGGGAAAGGTGGGACAACTCGAA	
DG5S91	168014827 - 168015078	GGTGCCAATTAAATCCAACAAGGTAGCTGAGTGTGGT GGTGCACGCCTGTAGTCCTAGCTATGCAGGAGGCTGA GGTGGGAGGATCACTTGAGCCTGGGAGGTCGAGGCTG CTGTGAGCTGTGATTGCACCGCTGCATTCCAGCCTGGG AGACAGAGCAAGATCCTGACACACACACACACACACA CACACACACACACACACACACACACATTCCAACAAGG TAATGTGTAGGAGGAAGTACCCGAGCTT	SEQ ID NO: 26
DG5S92	168065529 - 168065864	CAACTCCTGCAGCCCTTTACGCCAAGCACAGAAATCC AGGAGGCAGAGCCTAGCGCTTGATGACATGGTAATTG GGCCTGGAAGTGGGGATTTCTGTCACTTACCTCTCCTT GAAAAATAATCACTATTGCCAACGCCTGGTTAATTAGC CTGATTCAATTCTCTTCAGCCTCATTTTGCTCAAATCTA CCAGATTTGTGGTGCTCCTTGGTCCTCCACCACACTTT CTACCCCTCATCCCACTTTGTGTGTGTGTGTGTGTGTGT GTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTAGGACA TGGCCAGGAATCCTGACTGGCTTCCTTTAAA	SEQ ID NO: 27
DG5S491	168081175 - 168081342	AAGACCACCCTCCTGTTGTGCTCTCCTGAAATGTATTC ATATCCACCCATACACACACACACACACACACACACA CACACACACACACACACACACACACACATTCTCTCTCT CTCTCTCTTTCTCTCTCTCTCTTAAATGTCAGTTTTCTCT TCCTGCTTTCCAGA	SEQ ID NO: 28
DG5S9	168139425 - 168139680	CTTGACATTCAGGGCCTTCTGAGTACATCATCTTGTCA AGAAACACTGAACTATTCAGTACACAACAGGTCAGAG GTGCCCATTTGATAGCCTGAGGATGGAATCCTTATTGC AGCATTTTGCGTCATGCCACATATATGTGTTTTTTCAAT CCTCCTCTGTTTTAAAAATTGGAAAATTTCATACAACA CACACACACACACACACACACACACACACACACACAC ACCCCCCATACCACACCACACCACATCA	SEQ ID NO: 29
DG5S876	168266982 - 168267134	AGCCTCTGACTCTCCTCTGTGGGGCTAATCCAGAAAAT CTTACTTTAGAAATAACAATAATAATAATAATAATAAT AATAATACCTCATTCATCTTTACTTATCATGTGCTAGT ATGTTTCTAAGCCTTTTGGCATAGCCTTCAATGTCCCT	SEQ ID NO: 30
DG5S97	168286866 - 168287096	CTCTTCCCATGTCCTGCTTCTCTCCTTCCTGCGGGTTGG GACCCAGTACCCTCCATCTCTCTCACTCCTCCCCTCTCA AACCCTTCTTTTAGGAAAGGAGTCCAAATCGACCACTT ACACCTCAGTTCAATGCAAGCCAGTATAATTAATAAG GAACATTTAAGGGTGTGTAAGGGTGTGTGTGTGTGTAT GTGTGTGTGTGTGTGTGTGTAGCTCACTCTGCCTCTGC C	SEQ ID NO: 31
D5S2052	168324273 - 168324633	GATCACCAGGGAATCTAGATGGAATCCATAGTNCTNC CCTGCAAGAATGCTGCAATTCTGTACCGTGGAGGNGC CAACAGAATCACCAGGCTCTGTGACTCAGTCACAACA CCCTGACCTGCCCCTGTCCATTCTCCATATCATACCCA GAGTGGTCTTTTCAAAGCACAGCTTTGACCAATTCTCT GTCTTTCACACATACACACACACACACACACACACAC ACATGCGTGCATGCATGCCTGAAATAGTATAGTATTGC TCTTAAGATAAACATTAANGTTCCTACCATGGTACAGA AAATATATGTNGTTAGGCCCCGTGGCTCTTTCTTTTCC AGACTCCTCTTACCCTTTTGTG	SEQ ID NO: 32
DG5S879	168369069 - 168369202	AAATCTTCCATTGCAGACCAATTAAAATTTAAAGATTT TCTCTCTCTTTCCCCCTCTTCTCTCTCTCTCTCTCTCT CTCTCTCACACACACACACACACACACACAACTCTC	SEQ ID NO: 33

		CAAGCACAAAGAGCTGA	
DG5S880	CHR5: 168376530 - 168376775	TGAGTGGATGAGGGAGAAGGATAAAAGTCATAAAATG CCTCGCAAAAACTTTGAGGTCTGCCTGCCTGGTATTAC AGAGAAGCTTGCACAATACAGAATGTTTTGTGGGAAG GAAGGCAGGCAGGCAGGCAGGCAGGCAGGCAGGTTG GTTATGTTTTCACTCTTGATATCTCAAAGCTTTATGACA CACTCATGGAGTGAACATAATCTTTGTGGCATGATACA AAGGGACTGAATCACTCAAG	SEQ ID NO: 34
D5S400	168378412 - 168378696	AGCTATGATCATGCCACTGCACTCCAGCCTGGCTGATA GAATGAGATTCTGACTCAGAAAAATATAAACACACAC ACACACACACACACACACACACACACACACACACACA CACAACTTTCTGTCTGCCCCCTTGCTCTTCCTGTCCCAT CTCTGCCTTTCTTCTTTCCTCTCTTTGTCAAATCTCCTTC GTCTGCCTCACAAAGGCCAGTGAGCCCCAGCCGCAGA CCAGGGAAGCCAGCAAATTAGGAATTTTCTTCACAAA GTTTTGAGTAGCT	SEQ ID NO: 35
DG5S881	168395631 - 168395815	TCTCCCATCTCCTCCCTAGCTATCCCCTGCCTGGTAATC ACTGTTTTGTTCTCTATTTCTGTACAGTTGGGTTTTTGT TTGTTTGTTTGTTTTTAGATTCCACATATACTTGAAACA ATGCAATCTTTTTCTTTCTTTGTCTGGTTTATTTCACTT AACACAGTGCACTCCAGGCTCGTCTATG	SEQ ID NO: 36
D5S2043	168499686 - 168499956	CCAGAAAGCTTCACCAAGGGGCGAGCATGATTATGCA TGAGCTTCTTAAATCTGGACTTCCCGACAGCTTCTCAT GACAGGTCTTCTGTGGAAGACTCCTTAGATTCAGACCA TCAGGCCTTTNAAAAGCACAGGAACCTACTTTACCTCG CCCAACTCTACGGATGGGATAGGNACTTACAAGGACA TTTCCTCATTGGATTCCAATGTTCATTCTCCCCTTCTCT CTCTCAATTAATCTCCCCCTCTTCTCTTTCTATCTACAC ACACACACACACACACACACACAGAGAGAGAGAGAG AGAGAGAGAGAGAGAGANAGAAACAGCTTCTTCACA GCGGGAAGCAGGGGAAGGGTATCTATTTCCGGCAAGA TC	SEQ ID NO: 37
DG5S1058	168554788 - 168555167	AAAGTCAGCTAGGGCGACTGAGCCAGAGAGATGGGGC ACACAGCAAGAGGAGACCTGACAAAGTGCAGGTGTGT CCTAGAGAAGGCAAGCGAGACCACTGCATGATTGGAA TACCAGCCAACCCTTGCCTGTTCTTGTTCCAGCAAAGT GCCCTTTTAAAATAAATTTATGTATATAGTCTCTGTGT GTGTGTGTGTGTGTGTGTGTGTGTGTGTATAGACATAT AGAAATATATATTCCTAATTCAGAACTCATTCGTAAGT GCACACACTGACATGTGTTTCATGTTTCCCAATTTATC CCAGAGCCTATATGCAGTGTTTGGCTGCACAAGTAGG CATTAAATGCAACCACTGGGAATGAGAATGGTGGCCA CAAC	SEQ ID NO: 38
D5S2075	168569742 - 168570114	AGCTTTGAAATCCCATCCAAACTNATTGGCGTTTCAAA CTGAATCCCAGATGTTCACTTACTGAGAAATAAATGA ATGGCCCAATTCGTGGACTGANGCAGGGNCCCTCACA AATAGATTCCAGGTGTGTTGGCCTCTGGACCACTATCT TTCTCTGTTTTACATACACATACATACACACACACACA CACACACACACACACACACACACACACACGGCACC AAGTCCATCCTGAAAAGAATTCAACGTCATCTCCAAGT TAGAGCCAGTNTAGGATGAACAGAGGTAGTTACCTAA CACAAATAACATATTTTCAATTGTGGATGAAGGCAAA GGGCTCCACATTCACACTCTTGTGCCTTCAATA	SEQ ID NO: 39
DG5S883	168592111 - 168592265	GGCATGGGATGTTTGACCTAAGAGATGGACTAAAGCC AATGAGTAAAAATGTAAAGCGTACTTAGTCAAATAAA TTCTTCTCTCTCTCTCTCTCTCTCTCTCTCCTTATTCA	SEQ ID NO: 40

		TCACTCTTGGGCCGTGATGATGATGAGGGAGAGGAGC AGT	
DG5S38	168715977 - 168716367	TATTTGCCTGCCTGGGTTAGATGATTCTCCAGGCTTCT ACACAATTTTATGTTTATATGAAAATAGCCACAAAGG GAAAAGAGGACAATAAAACAAGAGATATGAATAATA ATGTATTGTATACTTGAAATTTGCTAAAAGAGTAGATC TCAAGTGTTCTACATACACACACACACACACACACAC ACACAAAGGTAATGAATGAGATGATAGGTGTTAATTA ACTTGATTGTGGTAATCACTTCACAATGTATACATATA AAAACATCATGTTTTACAACCTACATTTATACAATTCC TCAATTATATATCAATAAACCTGGAAAAATAAAGATG TATAAAAAAGATTTACAAATAAGATTTTTAAAAAAGG ATTGTGAGGAAACAAAG	SEQ ID NO: 41
DG5S37	168770226 - 168770418	ACCAGCTAACCTGCCATGAGACTGTTGTGTAGCCATCT TCACCTCCTCATCTTCAGGGAAGGGGATGAAAATATCT GTGCACTGCAAATGTTAACTATATATACACACACACAC ACACACACACACACGTACAGTAGGCCCTCCATAACCT GAGGTTCCACATCTGCATATTTTACCAACTCTGGTCCC TGC	SEQ ID NO: 42
DG5S886	168803195 - 168803445	TTGTTCCTGAATGGGAGGAGGACTGGTGAGTGAGGGG GAAAGAATGGAGACAGGACTGAGAAGAACCAGAAAT TAAAATAATAGTAGTAATAGCCTAACATGTACACGTA TATGAGATCTATCTATCTATCTATCTATCTATCTATCTA TCTATCTATCTATCATCTATATATCTATCATCCATCATG TATCTATCTATTTGCATATATAAGCTATAATATCTGGC TCTGTTCTAATTGTTT	SEQ ID NO: 43
DG5S101	168833451 - 168833700	CCAGGCTTGGATGAGAGAATAATCTTAAGGAAGTCAG CATATGTTCTAGAAACATTCAGAAGACAAAAGAGTCT GTTATGAAAGAACAAAGTATTTGTAATAATAAATTGA ATGTTACATGGACACACCCAGACATACACACACAGAC ACACACACACACAGTTTTCTTCTCTCTCTCTCTCTCCC CACTCCCCTCTCTCATACTTTGCAAACAAGCTCCTCAG CAGCTGGTAAGCTGTTCCCTGTCC	SEQ ID NO: 44
DG5S102	168895047 - 168895352	TCCTGACTGCTCAAAGCTCAAGGTGTTGCCTTTTTCAA ATGGGATGCAATAGCCTACTCATTTTCCAAGATTAAAG CTAGAGAGAAGAATGAATGAATGAATAAATAAATAAA TAAATAAATAAATAAATAAATAAATGAGCAAAGTTAA TATTAGCTGGAAAAAAATAGGGTACAGGTGGAAGGAAT GAACCCATATTGAGAGTCCACTATGTGTCAAATTCCTT GCATGGAATCTCTAAGGTCTGTCTAGCTTAAAAGCAAT GCCAGCCTTGCTATCTGTACTTGATGAGGAGATGGATC GGAA	SEQ ID NO: 45
DG5S39	168920224 - 168920577	CCAAACTGCAAACCCAAACTTCTACAATGAATTCATGT GCAACTTATTCTAAAAGATCTATACACACACACACAC ACACACACACACACACACACACACACACTTCCTGTCCT ATTGCTCTTCACTACTTCCTTCATCTCTGTGCTACAATC TGGGTTCATTTTTCTTCCCCTTGAGTAATTTATTATGTT TTTTACAGTGAGTCTGTTGCTCAAAAATTCTTTTAGTAT TTATTTGTATAAAAAGTCTTAATTTTGTCTTCATATAAA ATTTTGTTTGACACTCTATTATAAATTGACTGTTATTCT CTTTCCATGTTTTCCGGACATAGTTCCATTGTCTTCTGA CTTCCA	SEQ ID NO: 46
D5S1456	168968063 - 168968256	TTCNACCTTATGGGTATATCGAATTGTAACCCCGTTGT AGGTCAAGGAGCATCTNCATATATACATACATAGATG ATAGATAGATAGATAGATAGATAGATAGATAGATAGA TAGATAGATTTAATTCTAAANTTTCCAAATACTCTTTC	SEQ ID NO: 47

		ATTTAAATGATTATAGTTTTACAACAATTTCATATATT NTATAGGTAGGAGAATTAGGGTTTTCCAGAGAAATAG ANNCAATAGGCTGTGTGTGTATATAANGATTTANTTTN AAGA	
DG5S106	169021310 - 169021609	GTTGGGCATGATGGTGTGTACCTATAGTCCTAGCTACC TGGGAGGCTGAGGCAGGAGGATCCCTTGAGCCCAGGA GTTTAAGACTAACAAGACTCCATCTCTGAAAAATAAG GCAAAAAAAGTATGAAGAATAAAATAACAATCACTTA CATTCCAACCACCTATAATTAATCATTGCCAACACCTG AGGATATTTGCTTCCAATCTACAAGACTGCATTATTAT TATTATTATTATTATTATTATTATTATTATTATTATTATT ATTATTGAGATGGGGGTTTCTCTTTGTTGCCCAG	SEQ ID NO: 48
DG5S40	169067041 - 169067434	GCAGACAGGGTTCAAATTCCAGCCTCCCCTCATATTAG CTGTGTGATCTTAGGCAAGTTTATTCATGTGTAAAAAG AAATAATAACCTCTTCTCGTGGGGTTGCAGGTTAAACA AAAGAGTAGGTATTAAAACAACTAAAAGAGTATGATT GGATTGTTTATAACACAAAGGATAAATGCTTGAGGAC ATGGATCCCCATCTTCCATGATGTGATTTTTATGCATT GTATGCCTCTATCAAAACATCTCATTTACTCCATATAT ATGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGT GTGTGTGTGTATGTGTATGCACACACTATGTGCCCACA AAAATTAAAAATTTTAAAATTAAAAAATTTTAAAAAT AAACATGCTGCTGGGC	SEQ ID NO: 49
D5S504	169142805 - 169143006	AGCTGCCAGCACACAAGGCCCAGAGGTACTTTATTGG ATGCCAAATTCTTTTAACACACCATGAGAAAAGAAGT TGACAACTTTCCCATGCATTTTGGAAGGTGTGTTAGAA CGATTCAACACACACACACACACACACACACACACAC ACACACACACACACATTTATTGGGTTGGGGGAGCCTT AAAACTTACAAATCT	SEQ ID NO: 50
D5S1961	169173385 - 169173631	AATTTCTTACCCTTTATCCCCGTCTTCTACTCCCATTCC ACATGCCCCCCACCCCCCATGAATGATTTGTCTAATGC GTTGAATATGCACGTGTGGTTTTGGGTGCATGTATGTT TACACACACACACACAGACTCTCTCTCTCTCTCTCTCA CACACACACACACACACACACACACACACACACTCAT GCCTCTCCTTTGAAGAGGATCAGATATGGACAGCAAA GGGCATTAGCATCTTAGCT	SEQ ID NO: 51
DG5S108	169203019 - 169203370	GCTCCAAAGTTCCTGATTCCAAAGCCTAAGTTAAGCCA TCTTAACTTATATTTCAGGTGACTAGTGGAATTTTTTAT GCCCAGTGTAGGTGGTAATGACGATGGAGATATGGCG ATGATGATGATGATGATGATGATGATGATGATGATGA TGGCAGTAGTGGTGGTGGTGTTGGTGATGGTGTTGAA GATCACCATGTCTGACCACTGTTGTCTGTGTCCTTTGT ACAATTGTTCAGATGCAGTGTCCTGGTTGTCACATAGA TGTCTCTGACTGTTTTACAGGCCTTCACCTACCACCAT ATCCAGGAGATCATGGTCCAGCTGCTGCGGACAGTGA ACCGGACAGTCA	SEQ ID NO: 52
DG5S41	169277936 - 169278300	TTAACCCACTGCTCCCATTTTGCTGGTGGAAAACTGAA AACCAAAGAGATTAAGTCATTTACCCAAGGTCATGTA ACTAATATATTGAATCTCAGATGTTTTAATGATTTTGA CTCATTTCCAATTTGCCTGGCTATATAGAGAAAATATT TGAGGAATTGACAGGGAACACACACACACACACACAC ACACACACACACACACACACACACAGAGGGAGGGAG GGGAGAGAGAGAGACAGAGACAGACAGAGACTGAAC AGATTATTTCTCCACTGATGTTCATTATTTAGATCTATT TTCAACATTTAAAGGCAATTGTCAGCATAGTCAATTCA GCCATTTTAAACCATCAAGGGCCAATG	SEQ ID NO: 53

DG5S42	169285983 - 169286144	GCAACCTATTTGTTAGCAGCACATGCGTGCGTGTGCAT GCACGTGGGCACACACACACACACACACACACACACACA CTCTTTGCAGGGGAATTTTGAGCCAGAAATTTATCTGT AGGCCCATATTCATTCCTTTTTGCACATTTCTATTGTGA CCTTGGGCA	SEQ ID NO: 54
DG5S10	169356049 - 169356318	CAATTCCACACAGCTGGAGAGTAACAAAGCCAGAAAT CACATCCATTTGTGTGTGTGTGTGTGTGTGTGTGTGTC CAAATCCTGTGATTCCAGTGCCAGGATACACTGTCTTC CGTGTTCAACAGTCATGAAAGTATTTTAATGAACACCT GGCCCTGCAGTGCCTGATGTAGCAAATGCTGCAGATA CTCCACCCACCGACTCTTGGACCACCCAAAATCCACTG GCAGCTTCAGTGAGGCTTTCCTACTTCTTTCTTTCCCTG GGCT	SEQ ID NO: 55
DG5S110	169391090 - 169391341	CACTGGACTTGGAGTCAGGACATCATTTTAACAGCTTT ATCGAGATGTAATTTACATGCCATACAATTTACCCAAA GTGTACAATCATTGACTCTTAGTATGTTCACAGAGCTA TGTAACCATCACCACAATCAATTTTACAACATTTTCAT TACTCCTAAAAAGCAAACCTGCACCCCTTAGCCACTGC TCTGCCAACACACACACACACACACACACACACACACGC GTGCGCACACACACCCAAACACTC	SEQ ID NO: 56
DG5S11	169409260 - 169409401	CGCGTGTACCTCCACATAGATGTTTGCCAATGCCTATG CCCAAGACACACACACATACACACACACACACACACA CAGGATACATTCAAGCACACACTAATGTATGTGCACTT GCCTGCACAGAGTCCACATCACACAGGC	SEQ ID NO: 57
D5S1973	169424532 - 169424861	AGCTTCTAGTCTGCTATGTTGCTAATTGTCTTCTTGGTC ATCTTTTAAAACCATTTCTGTGAAATTATAGCCTCCTT ACTCCCTTACCCTGAGTCTGGATGTTTCTGAAGATGAC TGATCTCTACAGTGAGAAGGCCCTGGGAATTGACTGA CTCACTCTCTCTGTCTCTCTCTCTCTCTCTCTCACACAC ACACACACACACACACACACACTCATATACATACACA CATAGATACACATATACATGCATCCACACATGCACAC CCTGGGCACACCCACACACCCTACAACTGCACATGCA TGCACACACATAATGTTAACTGAAGG	SEQ ID NO: 58
D5S397	169542970 - 169543287	AGCTTTTGGCTATGGAACCTTAGGCAAGATGTTCATAA ACCCTTTAATCTCTAGTGCCCTTGTTCATAAAAAGAAG TGAATCGGATCCCTGCAGGACTGTTTTTGTATTCAGTG CACAGGTGTGTGTGAAGACACCCAGCATGTTGCCAGG CACACAGAGATGTCTACCTTGATACTTTTCTCTCCTCCT CCCCGCAAATACACACACACACACACACACACACACA CACACTCACACACTCTTATTTTGATCTTGGCCTGAGGC TGACAAGCCCCAGATTAGTGATCAGTGACAATTTCGG CTTTATCAGCT	SEQ ID NO: 59
DG5S115	169586308 - 169586550	CGAGGATGCACACCTCATTAATTGAGGAGCTAGGATT TAGATCCAGAGCCTCATGATTCTAAAGCCTGTTTTTTG TTTGTTTGTTTGTTTGTTTTGTTTTGGCCACACTAGGTT TCTAGAAACTTCCAGTTCCTTCTTAAAAGTCCTTTTTGG GCATTCCGGCCTAAATCCCAAAACTGTGGTCTGGGTAC AAGAGAGAATTAGGCCAGTGAGAAAAATTTAAACCAC CCTGCCCTCTAAAT	SEQ ID NO: 60
DG5S888	169653226 - 169653848	CTTGATGTCTTCTTTCACCATCCCCTGGCACCCGCCTAT ACATTTATTACTTGAAACAGACTGACCTTTATTTGGTT AGGCCACTGTGGTCAGGTTTCTGCAACATGGGGTCAC ATGCCTTCCCAACTGACACAAGTCTCAAGCTCCTTTTC TCTTCTTTTTATAACTTCTAGAAGCATAGCTTCTACCAG ATAAGGATCTAACCTTTTCAGTGGAAAACAAAAATGG CAAAGAAGTAAAGAAAGAAGAGAGAGAAAGAAGAAA	SEQ ID NO: 61

		GAAAGAAAGAAAAGAAAGAAAGAAAGAAAGAAAGA AAGAAAGAAAGAAAGAAAGAAAGAGAGAAAGAAAG AGAGAAAGAAAGAGAGAAAGAAAGAGAGATGGAGAG AGGGAAGGAAGGAAGAAAAGAAAGAGAGGGAGAAG AAAGAAGACAGGGAAGGAAAGGGAAGGGAAAAGAG GGAAGGGGAGAGGGGAGGACAAGGGAAGGGGAGAG GGGAGGACAAGGGAAGGGAGGAAGGAAGAAAGGAA GGAAAGAAGGCAGGAAGGAAGGAAGGAAGGAAGGA AGAAAGGAAGGAAGGAAGGAAGGAAAAATAACTAGG GCCTTTCACTTTTGCCTTCAATAGCAGAGTGGCCCTGG ATAT	
DG5S44	169661202 - 169661574	TATTGGCAGAGGGTGAGTCCAGTGTATAAAAGCAACT ATATTTGTGCAATAAGGCAACCTCTAAACACAAGTTAC TACTTCATCTAATGCCACACACACACACACACACACAC ACACACACACACGAGTCATCTGTTCCAAGGCTGTTGCC TTTACTAAGTGATGCTATGTTGGTCCTTGAGGTGGTGC CTTCCTGAGGGTTTTCAAGCATAGCTTTGGCCATGCAC AGTTTTCTTCTTATACACACTCTGAGGAGCCCCGCCGT CACGGTAATGCACCTGCCTCACAAGCTGGTGGGCAGC TTAAATGAAATACACATTTTGCTCCAGGCCCAGCACTA GCTCATCAATGTGAGCTGGTGTTAGCCTCACC	SEQ ID NO: 62
DG5S45	169693772 - 169693912	CAGTAGCCAGGAAGCTGAGGAACACACACACACACAC ACACACACACACACACACACACAAACACACCCCTTCC TGGCTCCAGTTCCGCACCACCCCACACCCCCAACACCG GAAGTAGATTTCTCAATAGGCAGGGCTG	SEQ ID NO: 63
DG5S46	169702377 - 169702678	TTTGCCAGAATGTCCTCACACCAAATAGTGGACCCCTT CTTTTGCTGATTTATCTGCTATTGTATAGGTGTATGTGT GTGTGGGTGTGTGTGTGTGTGTGTGTGTTAAGGCAGGT GGTAGTATGTGTAGGGTAGGGTTTCCCCAGTCACCTGG AGCCCTGAGTGCCTGCTTCCCTAAACTAGGCCAGTTTA GCTGACTGGCTTCCTTTGTGTATTGGTCCATTCTGCATC AAAAGCATCTGAATTTTCATTCAATCTCTCTTCTGAAT TTTCACTTTTAAAAACCTGACCAGTCCCTTGTG	SEQ ID NO: 64
DG5S47	169788696 - 169788899	CTCCTCCATGGTAGGGACTGGTTCTCTTAGGCCCCTGT ATCCTCAGGCCCAGCATGCTTGGGAAAATGTTTGCTAA TGCTTTGTGACTCAAAAGGAATCACACACACACACAC ACACACACACAAACACACACACACAGTTTTTAATATT ATCAGTCATATCAGCCCCCTGAGGCAGCTGCTCTGTTC CAGACAAACCCTGTT	SEQ ID NO: 65
DG5S119	169843903 - 169844041	GGGTACAGGAGAGTTGTGGTGGGCATTAGTACTACTC CTGCTGCTGCTGCTGCTGCTGCTGCTGTGTCCACTGTT AGTGACAGAAGTGGGAAAATATTTAAGTTGAGTTCAC ATTAGTGTTCCCAGTTTAGCGTGAGC	SEQ ID NO: 66
DG5S953	169866165 - 169866415	CCATGAGTTCAGGCAGTGGGTTAAATAAGATTTCCCTT GAAGTCGAATGAAATCACAATGCACCACACACAGGGA CACACACACACACACACGCACGCACGCACATCACACA CACACACACACACACACACACACACACACACACATAC ACACACACAGTCTCCCTGGGGCCAATCTACTGCCCCCT GAACCTCACCCATCAGCCAGGTGCCTGGCCCCGGGTCT GTCTCTTAGGGTTACATGCTCCCGG	SEQ ID NO: 67
DG5S955	169951970 - 169952619	ACTTATGGAACACCTACTCAGTGCCAGGTATTGTTGTA GATGCCAGGAGTACAGCAGGGAATAAAACAACATCCC TGTCCTCGACACAAACACACAAGTAAATAGAGAAGGT CAGAGATAAATGCTGTGCAGGAAAACAAAGCAAAGTG AGGGATGGAGAGTGCGGAAGGTTGGGGCACTTTTGTT TCAGATGAGTGTCAGGGAAGCCCCCTTGGAGGAGGCA	SEQ ID NO: 68

		CTGTAAGGGCACAGAATCGAATGAAAGGAGTATGTGA AGGTGCTTAAATTGTTTCTGTTTGGTTTGGTGTGGTGT GATGTGGTGTGGTGTGGTGTGGTGTGGTGTGGTGTGGT GTGGTGTGGTGTGGTGTGGTGTGGTGTGATGTGATGTG GTGTGCGGTGCGGTGCGGTGCGGTGCGGTGCGGTGTG GTGTGGTATGGGTTGAGGCTGGCCTTAGGAGCCTGTTG GCCTTCCAGGCCAGTCCTGAAGCCCAGCCCAGAGCAC CAGACTCTGCAGTCAGTCAGTGGAGGGCCCACATCTC AGCCAATGCATGGCTTTGGGTGGTGACTTCATCTCCCC TAGTGTTCCTTTCCCCCTCTGCAAAATGGAATGGGGA TGGCTCAGAACTCCCAGCGGGAGTTAGGAGGAATAAT GTATAGGAAGTATGAGCAGAGTGCCTGG	
DG5S13	169961410 - 169961530	TGATGTGCTCGTTCCCATAGCCCCGCTGTGTGTGTGTG CGCGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTG TGTTTGGTGGGGTGGGAGGGGAGGCAGAAGAGGAAG AGAGGGCA	SEQ ID NO: 69
DG5S123	170015858 - 170015997	TGGTGATCAGCTCAGTGTCCTTGGAAAAGAGCAGAAA GTGGTATCACGAACATATCTTCTCCTTTGCTTCCTTCTC CTCACTCTTCATCATCATCATCATCATCATCATCAAAT ATGGATCTGTGAGGCTACCTCTGGG	SEQ ID NO: 70
DG5S124	170041996 - 170042336	GGAGGAGAGACCAGCATTCACATTCAGTTATTGTTGTT TTAAATCCATTACGCACATACATAGGAGAAAATTTCA GCAACAGTCACCCTCTGAACCCAGTTCCTCAGTTCTCT CCAGAGGCAACTAAAATGCTCAATTATTAGTGTATCCT TTTGGAAATATTTTATGTATATGACAGTGTGTGTGTGT GTGTGTGTGTGTGTGTGTGTGTGTTCCTTTCCAATATTA AAATAATATTAACATTGGTAATAGTGGTACTAAACAA CTTAGGGTGTTTTTTTTTTCATTTAATAGTATATTTTTA GTATCTTTCCAGGAAAAGATACATGGATGTGCCACA	SEQ ID NO: 71
D5S625	170105556 - 170105787	TCAATAAATGATTCTGGGGATGTGTCTGTCTGTCCATC TGTCTCTCTCNAGANACANATACACACACACACACAC ACACACACACACACACACACATCCTGTTAGTTCTGTTTAC CTGGAGAACCTTGACTAACATACCCATTAAAACCAAA ATATGTCCTTCAGGGTGTTAATGTTTGGTTGAAGAAAC ACAGAAGTTTAACAATTGTATCAGGCTGGGCACGGCC TATAATCCCAGCATTTTGGGAGGCCACAATGAGNGGA TCACTTGAGCCCAGGAGTTCTAGACCAGCCTATGCAAC ATAGTGAGACAAAAAAATGAANAAAATTAGGGGTGTG GTGGAGCGCACCTGTAGTCCTAGCT	SEQ ID NO: 72
DG5S959	170167429 - 170167616	GAGTTCTATGGAACAGCATTTATTGAATAATAACATTT CAGGAAAAAAATATAAGCTTTACTGTATATTAAAATAC ATATATACGTTTATATATTATATATTATATTATATTATA TATTATATATATTATATATATTATAATATTTATATATTA TATAGATATAAATCAACTACAAGATCCAGTTCAA	SEQ ID NO: 73
DG5S960	170203240 - 170203459	TTGCCTAAGATCTAGGTGTTCAAAAGAATTTCTCCAAT CCACTTCAGCCTGTTATTATGTATGTATTCTGTTTTAAA TGAGAAACAAGAGTCATTTTCTCCAGAATAATAGAAC CATAGTGACACTTGAAGTAAGTCCAGTGGTCCTGATAT GATAATAATAATAATAATAATTATTATTATTATTATTA TTATTTTGAGACGAGGTCTGTATCTGTTG	SEQ ID NO: 74
DG5S16	170280782 - 170281084	ATGGAGAGACACGGAGTTGCTTGAGGGTACAGTGCCT GTAGATACTCAATAAATATTTGTTTAATTAAGAAAATT TCTGTTATTTGTGTGCTCATACATACCATTTCAGTCTGG TGAGTATTGTTCTTTCCTAGAGTTTACTTTTAATCTTAA GTATTTTCCAGGTCCTTTGTTGACTTCTGTTTAAACCAC AGTACACACACACACACACACACACACACAACTTTTGTG	SEQ ID NO: 75

		TACTATAATAGCTTCCCCAAAATTATAATTTAGTCATT GTGATGCAGATCTTCTTCCAAGGCCTCTACTTTGG	
DG5S962	170338421 - 170338789	AAACAAACAAACAGAAACACCAAAATGGATTCCAGCA TCTTATAAGTGCTTTCTCTTATGATCGAGAGTAAGACA AGCATGGCTACTCCCTTCTCTTCTATTAAATATTGTACT AGGGGTTCTATTGAGATAAATAGGCAAAAAACAAAAC AAAACAAAACAAAAAGGCATCCAGATTTAAAAAAA AAGGAATCTAGGAATAAAGGGATTACATCTCTACTTG CAGATGACATGATCTTATGTATAGGAAATCCTAAGGA TCCACTGAAAAACTGTTAGAACTAATAACATCAGTAA GTTTGCAGGATTATAAGATTAATACAAAAACTCGACT GAATTTCTGTGCACTTGCAATAAACAACCCAAA	SEQ ID NO: 76
DG5S132	170442700 - 170442947	TCTGCCCACACACTTTATGCTTTAAAACAAAAGGCCAT GTTGAACTTGTAGAACCAAATGATTGCTAATTACTTGG GGCGATACTAGTGATATATTATCTTACATACACACACA CAAAACACACACACACACACACACACACACACACACG GCTTGAGTCCAGCATGGCCTACTGATTTTAAAATAGGA AATGACAGTGTAAATGCCAGGATAAAGGACAAAGTGC TCTGACCTGTTGCCAAACCTT	SEQ ID NO: 77
DG5S136	170469573 - 170469843	GGGTTTAGGACCCACGTATCTTTTGTTTGTTTGTTGTTG TTGTTGTTGTTTTGGAGTTCAACATGTTTATGGTGTGTA GCCATGGTTGAAAGCTTTTATTTTATAAGATAGACAAA GCAGGAATTATTATTCTCATTTTACAGGAGAAAAACA GAAGGGCTATGTGGTTTGTTAAAAGGCCACACAGACA GTAAAGAACACAGCCTTTACATGGTCAGCCTCACATTC TAGTACTCATTTTATTACACTGCTCTTCTTCTCTGTTGC CTG	SEQ ID NO: 78
DG5S133	170480360 - 170480621	CTGGCCTCTTTGCCCATTTTCTAATTGGATTATATGTGG GGTTTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTT TGCTGTTGTGACGTTAGAGTTCCTTGTATATTCTAGAT ATTAATCCCTTGCCAATTAATAGTTTGCCAGTATTTTCT CCCATCCTGTAGGTTGTTCACTCTGATGATTGTTTCCTT TGCTGTGCAGAAGGTATTTAATTTGATATAATCCCATT TATTTACTTTTGTTTCTGTTGCCTGTGA	SEQ ID NO: 79
DG5S17	170499980 - 170500284	CCATCCAGGGTCTAACTCCAGCATTTGTATAAACTTGG ACAATACTTTTGCTACAGGGTTGTCATTGAAAGTATTG CCTCATTATATTTCTTAGTGGTCCCTGTATGAAGCCAT ATAAGAGAAACTTCTTAATTTAGCACTAGGAAATGCTT CTGTTGACTTGAGATGTGTGTGTGTGTGTGTGTGTGTG TGTGTGTGTCTGTGTGTGTGTGTGTGTGTCTGTGTGTGT GTGTATTCCCCTAATTGATAAACTATAAAATAATCTTT CTCTTTTCACTTTGGCCATCTGGAAATTTGCCACCAA	SEQ ID NO: 80
DG5S137	170644993 - 170645364	TGGCTTCCCAATCCTAGAAAAGGAAGAAAGCTGCATG TTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGTTGT TGTTAGATGGAGTTTTCTGTCGCCCAGGCTGGAGTGCA GTCACATGATCTCAGCTCACTGCAGCCTCTGCCTCCCT GGTTCAAGCAATTCTCCAGTCTCAGCCTCCCAAGTAGC TGGGATTACAGGTGCGCACCACCACTCCAGGCTAATTT TTTGTATTTTTAGTAGAGACGGGGTTTCACGATGTTGG CCAGGCTGGTCTTGAACTCCTGACCTCAGGTGACCCAC CTGCCTCGGCCTCCCAAAGTGCTGGGATTACAGGCGTG AGCCACCGCACCTGGCTGAAAGCTGCAT	SEQ ID NO: 81
DG5S53	170673106 - 170673364	GCCTTCGCAGATTGTACCTCTTCCTTTCACCCTTCTCGC TGGCCTGTGCTTCTCTCTCCATCGTGGTCTCCCACGCCT TGGTTTCTCCTCCATCCCCATCCCCATCTTTCGTGAGCC CCTCCAACTCTCTCCCCGTGTTTTGTACGGTCTCCTGCG	SEQ ID NO: 82

		TTCACTTGATTTCCTCTCACCCACCCCCGCCCCAAACA CACAGGCACACACACACACACACACACGCGCACACAC ACGGGCCTCTCGCACTCTCCTTCTCCT	
DG5S968	170675807 - 170676033	TGACTCTTGGCCTCTGTGTGTCTCTGGGTTTCTTTGTCT CCCTCCTCTCCACGGTCCTCTTGTCCTTTTGTCTTCCCT TTCTTGTTTCTTGAATCTCTTTGCCTTTATGTATCTGTCT TTCTCTCTCTCTCTCTCTCTCTCTCTCTCTCTCTCTCT TCTTTCCTTTCTCCCTGACTCCCTCTCTCCCTCTTCCAG GCCCAGCTCCCAGTAGCTCCTAAGGCAAA	SEQ ID NO: 83
DG5S904	170735417 - 170735632	CATTTGGGATAAATGTTGTCTTTAGTTTTCAACTACTTT TTCTTTGGCTTATTCTCTCTCTCTCCCTCCCTCCCTCTCT CTCTCTCTCTCTCTCTCTGTGTGTGTGTGTGTGTGTGTG TGTGTATTCATGTTTTCTTAATCTATCTGAATTGTTGTG TCGGTTTTCCATGCGAATTTCCAGTTACCTCCACAGTA TTCGTTTCAGAATGCTTCCT	SEQ ID NO: 84
DG5S906	170820130 - 170820505	TTGCAGTTTCATGAACCAAGTATTACTGCCTCAACAAT TAAAAACAACAGACAAATTATTTAAAAAACCATGAGG CGAGTGGTGGCTGGTGGCTGGTGGCAGGGCGGGGGCA GGGTGGCCTCTGTGTCTCATGCTTTCTGGTTGGTCTGT GGTCTTTGCACTGAGAGCTAGGGCCTTGCACATTCATT CATTCATTCATTCATTCATTCATTCTTTGAATTCAACAT TACTATGCACCAGGCGCTGAGAAGGCAGCCTTAGACA GATGGAAATCCTTGCTTTCCGGGAGATTCCATTCTAAT GGGTCATTGATTCAGTGGCCTCTTCAGTCATTTGTTCA TATGCATTTACTCGTACCTCTCATGTGCCA	SEQ ID NO: 85
DG5S141	170910447 - 170910786	AACTGAACCTGGGCTGTGTCAGTCTAAGACTTATGCTT GGAACCTGTAAGAAGAACAAGTGTGCGTGCATGCATG TGTGTGTGTGTGTGTGTGTGTGTTTGGAGGGATAGTGA AGTTTTTTCCTACAGCTACAAATAGAACATGCTTTCCT ATACAATTGTACTAATCAATATTATTTCCTTACATTATC TCCAGCCATTTCCCTATAATTAGACATTCAGATTATTT CAAGGTTGTTATTCCTATAAACAGTGATGTGATGAATT TTTTAAAGTTGGTTCCTCACATCCGTCTGTTCTTGTAAA TGTATCCATCATAGAACTGGACCACAAAGGTTGG	SEQ ID NO: 86
DG5S909	170941109 - 170941259	GGGAGTTCTCTTTCTTCAAGTGCTTAGGGGAGAAAATA AGTGAGAAAAAGAGAGATAGAGGAAGGAAGGAAGGA AGGAAGGAAGGAAGGAAGGAAGGAAGGAAGGAAGA AGAAGAAAAGGAAACGAAAAGGAAAGGAAAGGAAG AAAGGA	SEQ ID NO: 87
DG5S910	170946679 - 170947010	TCCATGTTATTCTCTACCTGTTGGTTCCTTCCTCATTGA AAATTGGTGTATAGATGGTAGATAGATAGATGATAGA TAGATAGGTAGATAGATAGATAGATAGATAGATAGAT AGATAGATAGATAGATAGATAGATTTTTATTTTTGGTC TATCTCCTTTACTAAACAGTAAGCTCCATGAAAATATG GATCATCACTGTCTTATTCACCATTATATTCTCAGCAT ATGGTATTGTCCTGGTATAGAATAGATTCTCAATAAAT GCTTGCTAAATGAATGCATTCATGAGTGAGTGAATGA ATGAATATGCGAGTGGATGAGTGTGTGGA	SEQ ID NO: 88
DG5S911	170985696 - 170986066	TGCTTGAGGGCAGGATCTATATGTAATTCCTTTCTGGA AAACCAGGGATTGAAACAGGATCTGGCATGCAATGGG CTGGATGGGTGAATGGAGAAATAGATGAATGACAGAT GGATGGACAAACAGATGGAAGGAAGGATGGATGGAT AGATGGATGGATGGATGGTTGGATGGATGGATGGATG GATGGATGGATGGATGGATGGATGGATGGATGGACAG ATGGATTGGTTGGTAGATGTGTGGATAGATGGATGGG TGAACAAGCGAGTAGATGGATGAGTAAATGGCTAAAT	SEQ ID NO: 89

		CTGGTGCTTTTCTTCCAGAATCCTGGATTCTGAAGGGA GGCTTTGCAGCCCTTCCTCGTGGATCACTTGCTCTG	
DG5S143	171018986 - 171019237	GGCTGAATTACTGGGCATGTTTCTGAGAAGAAAGAAC TTCTATTTTAATTATATATCTACAGAAACCAAATTGCC TGCTTACAGTTTTACATGTCTGATGATTGGAAGTTTTT GTTTGTTTGTTTGTTTGTTTGTTTGTTTCCACAGACTAG CCTCTGACTCCATATATTTCAAACTTTGTTCCTCTTCCA CTACCCACATATTTCTGATGTGAGACATTCTAGAAAAA TTTCATATTGCAAGACGGCTTC	SEQ ID NO: 90
DG5S513	171039003 - 171039366	TTGGCAGGATTCAGTTCCTCATGGGCACCAGACGGAG AGTCTCAGCAAATCACTAGCTGGTGACTGCAGCCACC GCAGTTCTTTATCACGTGGTTCTCTCCATAGGGCAGTT CACAGTGTGGTAACTTGCTTCATCAGAGCAAGCCAGG AAGAAGACCCAGAGACAGACAGAGAGAGAGAGAGAG AGAGAGAGAGAGAGGAGGCCTCTGAAAGAGAGAGAG AAGAGAGAGAGGCAAAGAGAGAATGAGAACTCCAGA AGTCACTGTCTTTTATAGCCTAATCTTGAAAGTGACAT TCATCACTTTCACTACATTTTCTTCCCCAGCAGTGCTCA GTGGGAGGGGATTATACACGGCCATGGAT	SEQ ID NO: 91
DG5S145	171040948 - 171041151	GCACATTTGCAGAGGTTTGAGGTCCCATCATTAGCCAT GCTTCTTGGTTCCTGCACTATGAGTATACGTATGTGGG CTGATGGCCTCATTCACTGGATACACACACACACACAC ACACACACACACACACACACACACACCTCACCAGGGA CTTGGGAGTATCTAAATGTTTGAGAATCATAGAGCAG GGAGACATCCAACAC	SEQ ID NO: 92
DG5S146	171073796 - 171074122	GGGCACATACAGCTTTCCTTGCAGGAAAAAAACCTGC TTAACTTTGTTTATTATATATTATTTGATCTGTGCTTCA TATATTATTCATATATTATTTGATCAAGTTGCTTCATGT ATTATTTGATCAAGGAATCATGTGTGTCTACAGCACCT ATTAAAATTCCCTGGCACTGAAATTCTGTAGAAAACCA TTTAGGAAAAGTTGATCTAACTGTATAATTATTAGTAA AACATATACACACACACATACACACACACACACACAC ACACACACACACCACAAGCAAACAAAAAAAAAACCAC CTTAATGGTCTCCTAACCAAGGCA	SEQ ID NO: 93
DG5S147	171107565 - 171107831	GCATGTTCGCCACAGAGATTCAATTAATTTAAATAGGT AGAGGACTTGGGGCAGTGCCTAGGACAACATTACACT CAGGGATGGTGATGATGATGATTATAATGATGATGAT GATGTTGATGATGATGATGTTGATAATGATGATGATGA TGATGATGATGATGATCATGATGATAATGGAAAAGAA GATAGAGGAGGTAGAAGAGGAGACAATCATGATGTTG GAGGTAGACTCCAATCTTCAGAATCAGAAGCTCAGGG TTGGA	SEQ ID NO: 94
D5S462	171134297 - 171134396	AGCTTAATCTATTATTTNAGAGGCAGAAAGTTAACTTG CTTATCCTGAAAAGAAGTGCAAATATATCCCAAAAGT GCCATTCTTTCATTCATCCACTCAAACAGATACACACA CACACACATACACACACACACACACACACACCCCTTTTC ACCCCTTGGTAGTGTACAGTCTCTGAGTTGTAAAAAAT AGTCATTNCTTTCTGCTTGAAAGACTGTATTAGCT	SEQ ID NO: 95
DG5S148	171140975 - 171141303	CCAGCATGATCCTATGAATCCTTATAAAAGGGAGATG GGAAAATTTCACACACACACACACACACACACACACA CACACACACACACACACAGATAGAGACAGAGAGAAG AGGATAAGGCAATGTAACCATGGAGGCAGAGATGGG AGTGCTGTAGCCACAAGCTAAGGAATGCTGGCAGCCA CAGATGCTGGAAGAGTTGAAGAATGGGTTCCCCCTGA GGGAGCACAGCCAGATGCATGCTTTGAGAGTTCAGCC CAGTGCTACTGACTTTAGACTTATGGTTTCCAGAACTA	SEQ ID NO: 96

		CAAAAAATTAATTTCTGTCGTTTCAAACCATCC	
DG5S914	171219902 - 171220159	CAAACGTCGCTGACCTGAGTCTGACCTGGGCTGCCTCG TGTTACCAACATGAAAAGGGAGTGAGAAAATCTGAGG CCAATTAACTTCTCTCCCTCTCTCTCTCTTTTTCTCCCCT TGCCCACCTCTCTCTCTCTCTCTCTCTCTCTCTCTCTCTC TCTCTCTCTCTCTTTTTTCCCCCTCCTCTTCTTGGAGAC ATGATGAAATTTCCTGAAACAAAAACTCGCAGCCCGT TCAATAAAATGCTTTCGCCTTTGGTG	SEQ ID NO: 97
DG5S150	171232854 - 171233077	ACAGTTGCCATTTGCTCATTTAAAATGTAGTGAGGTGT TTTAAAGAGGGTTTGTTCAATTTACCAAAAAGGGAAA AAAAGGGAAAAGAAGAAACTTATTGTTGAACGAACAC ACACACACACACACACACACAAAGAGCCTGGCTTAAT TTAGGGATAAAGCAAAGAAGTCAATACCCCCACATCA ACTATTGAAACCTAAGCTATTGCTGGAGTTGACAGCG	SEQ ID NO: 98
D5S429	171276128 - 171276490	AGCTCTNCCTAGCATTGTTTTCCTTTGCTTCATTTCCTC TTAAATGTGTTGGATGCACTTNGTTCCTGCTAACTAAT CTATCTTTNCAGTTTCAAATCAAATGAACCCAGAGAAT TTATTTTTACATTATTATCTTCAGATTTAGATTTGTTTT GCTTTTAATCCTGTCTTCATGAAGGGGAAAGCCATGTG TACCAGCATGGTTGATAAACCACCAAATCGTGAAACT TTGCTTGCTCCCCAAACCCCCAACCACACACACATACA CACACACACACACACATACACACACACACACACACAC ACACACACACACACACACAACCTGGGAAATTGGGNAG AAAACTGGCAAACCTTAAACTAG	SEQ ID NO: 99

Table 7 The DNA sequence of the microsatellites employed for the association studies across KChIP1 (including Build 33 locations).

NAME	POSITION	SEQUENCE	SEQ ID NO
DG5S1173	169653708 - 169653840	AAGGGAAGGGAGGAAGGAAGAAAGGAAGGAAAG AAGGCAGGAAGGAAGGAAGGAAGGAAGGAAGAA AGGAAGGAAGGAAGGAAGGAAAAATAACTAGGG CCTTTCACTTTTGCCTTCAATAGCAGAGTGGCC	SEQ ID NO: 100
DG5S44	169661202 - 169661574	TATTGGCAGAGGGTGAGTCCAGTGTATAAAAGCAA CTATATTTGTGCAATAAGGCAACCTCTAAACACAA GTTACTACTTCATCTAATGCCACACACACACACAC ACACACACACACACACACACGAGTCATCTGTTCCA AGGCTGTTGCCTTTACTAAGTGATGCTATGTTGGTC CTTGAGGTGGTGCCTTCCTGAGGGTTTTCAAGCAT AGCTTTGGCCATGCACAGTTTTCTTCTTATACACAC TCTGAGGAGCCCCGCCGTCACGGTAATGCACCTGC CTCACAAGCTGGTGGGCAGCTTAAATGAAATACAC ATTTTGCTCCAGGCCCAGCACTAGCTCATCAATGT GAGCTGGTGTTAGCCTCACC	SEQ ID NO: 101
DG5S45	169693772 - 169693912	CAGTAGCCAGGAAGCTGAGGAACACACACACACA CACACACACACACACACACACACACAAACACACC CCTTCCTGGCTCCAGTTCCGCACCACCCCACACCCC CAACACCGGAAGTAGATTTCTCAATAGGCAGGGCT G	SEQ ID NO: 102
DG5S46	169702377 - 169702678	TTTGCCAGAATGTCCTCACACCAAATAGTGGACCC CTTCTTTTGCTGATTTATCTGCTATTGTATAGGTGT ATGTGTGTGTGGGTGTGTGTGTGTGTGTGTGTGTTA AGGCAGGTGGTAGTATGTGTAGGGTAGGGTTTCCC CAGTCACCTGGAGCCCTGAGTGCCTGCTTCCCTAA ACTAGGCCAGTTTAGCTGACTGGCTTCCTTTGTGTA TTGGTCCATTCTGCATCAAAAGCATCTGAATTTTCA TTCAATCTCTCTTCTGAATTTTCACTTTTAAAAACC TGACCAGTCCCTTGTG	SEQ ID NO: 103
DG5S1178	169745438 - 169745539	GTGCTCAATGGCTGTTGAATAAATAAATGAGAGGA GGAAAGAAGGAAACAAGGAAGGAAGGAAGGAAG GAAGGAAGGGAGGGAGAGAGGGAGGGAAGGAGG	SEQ ID NO: 104
DG5S47	169788696 - 169788899	CTCCTCCATGGTAGGGACTGGTTCTCTTAGGCCCCT GTATCCTCAGGCCCAGCATGCTTGGGAAAATGTTT GCTAATGCTTTGTGACTCAAAAGGAATCACACACA CACACACACACACACACAAACACACACACACAGT TTTTAATATTATCAGTCATATCAGCCCCCTGAGGCA GCTGCTCTGTTCCAGACAAACCCTGTT	SEQ ID NO: 105
DG5S1592	169794522 - 169794686	TTGAGCTGTTTGGCCTCAATGGCATTTTATCTCTCT CTCTCTCTGTGTCTCTCTCTTTCTCTTTTTTTTTTTTT CACATTGAGCCATCTTCTTACAGCTGAGGTTTTCAT ATAAAAAAGCAAGTTGCTGGTTTCTCTTTAAAAGT AGGGCAATCTGGCAGTTCT	SEQ ID NO: 106

DG5S119	169843903 - 169844041	GGGTACAGGAGAGTTGTGGTGGGCATTAGTACTAC TCCTGCTGCTGCTGCTGCTGCTGCTGCTGTGTCCAC TGTTAGTGACAGAAGTGGGAAAATATTTAAGTTGA GTTCACATTAGTGTTCCCAGTTTAGCGTGAGC	SEQ ID NO: 107
DG5S955	169951970 - 169952619	ACTTATGGAACACCTACTCAGTGCCAGGTATTGTT GTAGATGCCAGGAGTACAGCAGGGAATAAAACAA CATCCCTGTCCTCGACACAAACACACAAGTAAATA GAGAAGGTCAGAGATAAATGCTGTGCAGGAAAAC AAAGCAAAGTGAGGGATGGAGAGTGCGGAAGGTT GGGGCACTTTTGTTTCAGATGAGTGTCAGGGAAGC CCCCTTGGAGGAGGCACTGTAAGGGCACAGAATC GAATGAAAG GAGTATGTGAAGGTGCTTAAATTGTTTCTGTTTGGT TTGGTGTGGTGTGATGTGGTGTGGTGTGGTGTGGT GTGGTGTGGTGTGGTGTGGTGTGGTGTGGTGTGGT GTGGTGTGATGTGATGTGGTGTGCGGTGCGGTGCG GTGCGGTGCGGTGCGGTGTGGTGTGGTATGGGTTG AGGCTGGCCTTAGGAGCCTGTTGGCCTTCCAGGCC AGTCCTGAAGCCCAGCCCAGAGCACCAGACTCTGC AGTCAGTCAGTGGAGGGCCCACATCTCAGCCAATG CATGGCTTTGGGTGGTGACTTCATCTCCCCTAGTGT TCCTTTCCCCCTCTGCAAAATGGGAATGGGGATGG CTCAGAACTCCCAGCGGGAGTTAGGAGGAATAAT GTATAGGAAGTATGAGCAGAGTGCCTGG	SEQ ID NO: 108
DG5S13	169961410 - 169961530	TGATGTGCTCGTTCCCATAGCCCCGCTGTGTGTGTG TGCGCGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTG TGTGTGTTTGGTGGGGTGGGAGGGGAGGCAGAAG AGGAAGAGAGGGCA	SEQ ID NO: 109
DG5S123	170015858 - 170015997	TGGTGATCAGCTCAGTGTCCTTGGAAAAGAGCAGA AAGTGGTATCACGAACATATCTTCTCCTTTGCTTCC TTCTCCTCACTCTTCATCATCATCATCATCATCATC ATCAAATATGGATCTGTGAGGCTACCTCTGGG	SEQ ID NO: 110
DG5S124	170041996 - 170042336	GGAGGAGAGACCAGCATTCACATTCAGTTATTGTT GTTTTAAATCCATTACGCACATACATAGGAGAAAA TTTCAGCAACAGTCACCCTCTGAACCCAGTTCCTC AGTTCTCTCCAGAGGCAACTAAAATGCTCAATTAT TAGTGTATCCTTTTGGAAATATTTTATGTATATGAC AGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTGTG TTCCTTTCCAATATTAAAATAATATTAACATTGGTA ATAGTGGTACTAAACAACTTAGGGTGTTTTTTTTT CATTTAATAGTATATTTTTAGTATCTTTCCAGGAAA AGATACATGGATGTGCCACA	SEQ ID NO: 111

D5S625	170105556 - 170105787	TCAATAAATGATTCTGGGGATGTGTCTGTCTGTCC ATCTGTCTCTCTCNAGANACANATACACACACACA CACACACACACACACACACACACATCCTGTTAGTT CTGTTTACCTGGAGAACCTTGACTAACATACCCAT TAAAACCAAAATATGTCCTTCAGGGTGTTAATGTT TGGTTGAAGAAACACAGAAGTTTAACAATTGTATC AGGCTGGGCACGGCCTATAATCCCAGCATTTTGGG AGGCCACAATGAGNGGATCACTTGAGCCCAGGAG TTCTAGACCAGCCTATGCAACATAGTGAGACAAAA AAATGAANAAAATTAGGGGTGTGGTGGAGCGCAC CTGTAGTCCTAGCT	SEQ ID NO: 112
DG5S959	170167429 - 170167616	GAGTTCTATGGAACAGCATTTATTGAATAATAACA TTTCAGGAAAAAATATAAGCTTTACTGTATATTAA AATACATATATACGTTTATATATTATATATTATATT ATATTATATATTATATATATTATATATATTATAATA TTTATATATTATATAGATATAAATCAACTACAAGA TCCAGTTCAA	SEQ ID NO: 113

Table 8: The Build 33 location and size of KChIP1 exons.

EXON	START (NBCI33)	END (B33)	Size (bp)
1a	169716298	169716511	214
UTR 1	169848417	169848523	107
UTR 2	169861083	169861154	72
UTR 3	169864589	169864679	91
UTR 4	169867066	169867173	108
1b	169867120	169867180	61
Ins-r	170075401	170075433	33
2	170081305	170081429	125
3	170082868	170082937	70
4	170084380	170084450	71
5	170085260	170085367	108
6	170095347	170095451	105
7	170096383	170096445	63
8	170098306	170098353	48

Table 9. The Build 33 location of SNPs found across KChIP1 after the first round of sequencing that was limited to the exons and flanking sequences.

START (B33)	MARKER	VARIATION
169716196	KCP_e1a_249924	C/G
169716299	KCP_e1a_250027	C/T
169716321	KCP_e1a_250049	A/C
169740666	KNB_24222	A/G
169740703	KNB_24259	A/G
169741172	KNB_24728	G/T
169746339	KNB_29895	C/T
169747941	KNB_31497	A/G
169751683	KNB_35298	A/T
169751753	KNB_35370	C/G
169751753	KNB_35399	A/G
169848476	KCP_UTR1_382206	C/T
169848542	KCP_UTR1_382272	A/C
169861338	KCP_3UTR2_395068	A/G
169864750	KCP_3UTR3_398480	C/T
169864875	KCP_3UTR3_398605	C/T
169866181	KCP_e1b_399912	G/T
170081291	KCP_1152	C/T
170081464	KCP_1324	G/C
170081473	KCP_1333	A/G
170082788	KCP_2649	C/T
170085097	KCP_4957	C/T
170085115	KCP_4976	C/T
170085151	KCP_5011	A/T
170085191	KCP_5051	C/T
170085217	KCP_5077	A/T
170085342	KCP_5202	A/C
170095344	KCP_15204	C/T

170095540	KCP_15400	C/T
170096291	KCP_16152	A/G
170098209	KCP_18069	C/T

Table 10. The DNA sequence of the SNPs identified across KChIP1.

NAME	SEQUENCE LISTING	SEQ ID NO.
KChIP1	See FIG. 1	SEQ ID NO 1
SG05S872	TGGCTGTCCCCTCTGCCTGGAGCAGGCTTTGCCCAGATGTCCTC CTGGCTCACTCCCTCACCTCCTTATGTCTTGACTCAGAGGTCAC CCTTCCAGATTAGACTGCCTGACCCCTTCTGTGCTTTCTGTTTT CTCCTTATTACAAATGAATCTGCACCATATTTCACTGATTGTGT TTGCTGCATGCATGAGGGCTCACATAAGGATGTGCTTTTTGTCC ACTTTGTTCATTGCTGAATCACTAGCACTGACAGCTGTACCTGG CACAAACTGGGTGCTTAAGAAATATTCTTGAATCAAGGAATCAA TAAATGAATGTTATAGAGAAAGCAGGAGAATAGATGATAATTGA GAAAACTGAAGCCCAGAGATGGGAAGTCACTGGCCCCATGTCAC ACAGCAGCAAATGCAGAACCGGTCCTGGAACTTCAGCCTCTCAG CCCCGGCCCTGTCCTCTCCTGTGCTTCTCACCACTTTATGTAAG TTTTTTCTTTATTTGTGGAGCTCTCAGCAGGCATTTTTCTCTCT GTGCTCAGTTGGCATTTTTCCCTTGAACCAGCTGTGTCTTCACT CTCTTCCCCATTTTCTCCAGAATATGTTCTTCTGTTTAACTGAA TGTTCTCTTTTTCTGCAGGTCTGGCCCAACTGCAATATCCAGAG ACTTTTCGGTGTCATATGAAAGAAAAGGAGCAGGAAGCCAAGAT GCCCCACCTGGCTTCTACATCAGGGTGATCTGCATAGTAAGATG CAAAGACACTGACATATGCCTGGGGGTAACGAGGGCAGTGGGGG GAGGGAGCTAAGCCAAGATAAGCCTCCTCCCCACCAAACATAGG TGCTACTGAGCAATGATAGGGGGCATGCTGTCTGCTCTGGTACT TGCGTAGGGAATGCTCTGAGAAACCTCACTAAATCTGCCCTCTA GAGTAGAGCAACCTGGGAGCTCAGGCTTCCCTTTCCTCTGTGTG ATGGGTTGGCGGTCCTTAGAGCCAGCCATTTC [A/G] TCCTGCT CCTTCTCTCCTCCCCTTCCTGACCAATAAAGATTGTGTGCTTCT GCCCAGTCAGCAGGGTGGGCTCTCACTCCATCCTGCCTCTGGTA TGACAGCACAATTCCCCTCATTCTTTATAATCATTATAAAATAA AATAACTACCTTTTAGAATACTTATTTGATATGAGGCACTTTGC AAACCCACAGTCCTGCATATCCCATTTGACATATCAGGATGCTG GGCTTACAGGTTACCCCAGGGGTGGAGTTGGGCTCAATCCTAGG ATTGTCTGCATCTGATTCTGAAGCTTGTTTTCTTTTCCCCTATA CACAATCATTCATTCATTCATTCAGTAATTTTTAAATTGAGACA TACTATGTACCAGCACCTGTTCTAAGCATTGGATTATGGTGATG AATGAGGCAGACAGGGTCCTTCCCACAAATAACTAACTCTATTC AAGCAGTGGGAGAAAAAGCAATGAATGGGAAATAAATGCACAAA TCAAGTAATGTTGGATGGGACAACTGCTGTGGTCCCATTGAAAC AAGCCCAGAGTGAGCCCAGTGTAGGGACTTCTTCATTGACTGGT TGGGAATTGAGTGACAATCGGTTGCTGCATGCTGATGGGTGCCA AATACAACCGTAAGGAAACACTCCCCTGGGAGGGAGGCGGGATC CAGGTTAGGAAAGAGCCTTGGATTGAGGCAGAGTGTCAGGAAGT GGGGAGGTACGCAGCTGACCTTGGAGAAAATCCCTGAGTGGTGC	SEQ ID NO. 114

	AGATCTCTTGAATCTCTGAGTGGCTCAGAGTCTTCCTGGAAATG CAGAAATCCCCATGCCACTTAGGGGCATCTTCATTCATCTCCAG CCCTCCTTTATTAAGTCATGTATACCATCTCCTCTCTTATGCTT AATGTCATGCCACTCTTCAATCCTTGTCCCTTCTTTCCCTCTGT GCCTGCTTGTGGTTTACTCCTGCTGACACCAAAGGCTGAGGAGG ATGAAAGAACAATTCCAGCCCTGAC	
SG05S873	GGTAATTCTTAAGCTGGCTGGGCCTAAAACTGCAAACTGGTATT GGGCATGCCAGAAGGTAACCATAAATGGGCTATTTGGAGATTTC TAGGAAGAAGAATGACATTTTGTTTCATTCCATTCCATTTCATT TCATTCCATTAATACTAAAAATATTAACTAAAGCATCATTTCTA CTATATATCCAGAAGAGAACATGGTCTTAGGTCTTTTAATAAAT GAACTTCAGTTGCAAACTTTCTGCTGTGACGTTATATTTCTCTT TCCACCCTAGACCAGCCCCTAATGGGGCCATGAAGTCAGATTTT TGGTTCATGGTGTTGTCGGGGCAGCATAGCCCAGAATTCCACTT CCTTCCCTGAGGACACATTTATTCTGGTAGATGTGCTGTTTTCC ATTTAAATGTCCTTTGGCAATAAAAGAGCTGGCTCCAACAGCAG ACCACGGGGCTGGCTTTGTCGGCAGACACCACGTGTTCATGACT GGCAGCTTTGTCTGGAAGAGGGAGCTTTTAAAATGCAGTTCTAT GCTGACTCTTTGGAGTCTTCCCAGGAAGATAACTGCTATTGCAT TGCATGCTTAATTTAGAGCACCTATTTTTCCCTCTCCTTCAAGG TTTCTGTATATCTTCTCAGTTCATGAAATTAATTATTTGGGTAC AATAATTGTACAAAGGCACTTTATCAGACACTTCGTATAAATTA TTTCTCATTCTCAAGGCAACTTGGAAAGGTCAGTCTAGGGGTCA GCTGCTACTTTTGGTGATCAGGCATCACCCCCTCCTTCCTCTTA GTACGTTATGACAGTGGCAAGTGAGCATTACCTGTGGACCCCAA AGGAGTTCATTTCCTTAGAGCCAGCCATTCCTCAGTTAATCTGG TCTGTCAGACACTCTGTCCCAGGACACTGAGCCTTGAGCATGTG AAGGTGTGGGCTCTGCTGGGGGCTTGGCAGCCAGCACCTGTCTG TGTATCACCTGGCTCCTGCAGCGAGAACCTGC [A/G] GTGTGAT TTCTGCAGCCTGGCCCTCTGAGATTCCATGGCTGCTGACCATTT TCCACTTTCCAAGACTGTTCACATTCCCAGCAATTCTGTGAGGC CCTGGCCTTCAAAGGTGTTCAATACATTCCTTTTTTTTTTTTTT TTTTTTTTTGAGACAGAGTCTCACTCTGTCACCCAGCCTGGAG TGCAGTGGTGCCATTTCAGCTCACCGCAACCTCCACCTCTCGGG TTCAAGCAATTCTTCTGCCTCTGTCTCGCAAGTAGTTGGGATTA CAGGCACACATTGCCACTTACGGCTTTTTTATCATTATTATTAT TATTTATTTTTAGTAGAGATGCAGTTTTGCCATGTTGGCCAGGC TGGCCTTGAACTCCTGGTCTCAAGTGATTCACCCACCTCAGCCT CCCAAAGTGCTGGGTTTACAGGCGTGAGCCACTGTGCTGGGCCC CATTTGTTATTTAAGGGAGAGTCCGTTTCTGCTGTTTGTAACTA AGGACCTGTCTGATCTCTAGGAATTATTGACCCCAGTTTTCAGA TAAAGAAGTTAAGCTTGAGGTTAGAGCTTTTGAGCAAAAACTCC TCTCCTAGAGAACTCAAGTATCCAGGAATACTCGGTCAAGGCTG GGCTGGACCAGGTCTGTAATCCTGATATTCAGAAAAGGGATGAT TTCTCCTCTTTGGTTTGGTTTTCTCACTGAGGCCTGCACACCAG TTTATTTCCTGACTTGTGCATTCAACATGGGCAAATCCAGGTCA ACAAAGACTGGCAGCTTATTCCTGAGTACAGTTCCACCAGGTAT GGCACACAAAGTGATATGAGTTAGAACACAGATGGATATAGATG TTTTACAAATGTAAGTTTGCATAACACACACACACACATTGCTA TGTGTTAGAAAAATACAATAAGCTCATCTAATTTATTATTTCAT GTGTCTTATTGCTCAGAAAGAGGAAAAGATTTTATTGAAGTTGA	SEQ ID NO. 115

	GAAAAGAAATTGAATTAAAATAATA	
KCP_rs31 5773	AGAAACTCCGACTGTCTTTCAGCACACAGAAGACACTGTACTGG ACCCGGACATTAGGCAGACACCCACGCCTGACTTTCAGGAGAAA AGAGAACATGACTAACGGATATTCTTAGTAGATGGTTTATTAGA AAAGAGAACATCTTCCAGCATGTGTCCTGGGGTGATGGGTGTGG GAAGCACTCAGTCCATAGTCCTGGTCCCTGGCTTCCCCAAGCCC AGCACCATGAATGTACAGTGGAAAGCAGAGGGTGCAGCGTCTCA GAAAGATGCTTCCACTCACAAGGATTGGAGCTCACAAGTGAGCT CCATAACCTGCAAACCAGAGAAACCTGAGACACTGCCCCTTGGC CATTTTATCAACGGAGACTTTATTGTGATTATCCCGGCAGGGGG CCGAGCTCTCCTCTCTGCAACAGGAAATGCTCTTTAGTGAAAAT GCAGCATTTCTCCAAGGGTAACAAAGCTGAACGCCTGCTTAGCT TATGAACCCTCAGTTGGCCTAGGTGGTGCAAAGACCCTGCTGTT ACTGCTTTGATCATCAGTACTGTGGACTGTACCAGGAGATCCCT GGGAATGTGCTCTGGGCGGAAGCAGCTTTTATCTTTGGCCCTCA CCCATGCTTTATATGGTGAGGTTGGGAAAATGGCACAAGGCTTC TCCTGAACCTCAAATCAACACCCTTGCCCCATTTAGATCCTATC TGGCTGTTTCTTGCTAATATTACTGCATCACTGCACCATCTTTC CTATTTCAGCAAAGTGGAGTCATGTGTGGTTTATGGGGTAGATG GACCCCAAAACTGATAATATGAATCAAGCTATGGTGTTTACTCC CTAGGAAATGCACAATTTTTCTGGAAACCTACAGAAGCTTCAAA TGCATTCGCCATGCAAAGCTAAGTCAGCAGAACAACCCGTTTGG CTTTGGAGGCTAGTTCAGTTCCGCGGACAGGGAGAAAGATGAGG CAGACTGTGGTTTTTCAGTTCCTGGAGCTTAC [A/G] GAGCTCC AAAGCTCCCTCTCTTCCCACCCTGGCTGCACTGTTCTTAATTTT AGATAATACCCTGCCTTCTCGTATTGCTGCTGAGCTCCTAGCAT CCTCAGTTTATCTGTCTGTGAAATGAAAAATCTAATGTTAAATT TTTTACCTATGGCATGAGAGAGATGGCTATGGCTCTTGTGAGCC TCTCTGCAGCCCCTCTTTTCCTTCAATCACCCTCTGTCTCTCCT GCCTTCTGCTTATTCTCTCTCTCCCCTCATCCCCACTTTCCCAG TGGGTCCTCTGTTCTCTTTTTTTTTTTCTTTTTAAATCTCTCTA TGCCTCCAGCCGAGAAGATAAAGAGTGTACATCTTTCTGGTTAA AAAGTTTTGCTTTGCAGAAACACAGCCAATTTATGATTCTGGCC TTCCCAGCTAGGGACAGTGTTCATTTACATTTAGGACCATGAGG AGAGAGGCTTAGCTGTGTGTTTCTGAGGCCGGAGAAAATTACAG TGATATATAACAGTGCTGCACTCATAGAGGTGCTGAGCCGGGGT TGGGCTCAGGCGGCCGCTAAGCTCAGAGTGGAAAGTTTCAGAGG GGAGGCAGAAAGGAGAGGTCTATAGCTCCTCCAGATTCTAGGTA TTAATTTACTAAGATATTCCTAAGCCAGAAAACAGAGACAGAAG ACAAAGAGAAAGAGGGAAGAAGAGCAAGACAGAGAGTTAGAGAG AGACAAAGAGAGAGAGAGTTAGAGACAAAGAGAGAGTGGAGAGGAG AGAGAGCAAATATTGAAAGGAAAAGGAAAAAGAAAGAAACCTGA CAGCTCATGAACTTTTTAAAAAGTTACAAATTAGATTTGAAGAG ATGGGCAGAGGTTTAAGATTTCTTCATTAGGCTGGGTGTGGTGG CTCATGCCTGTAATTGCAGCACTCTGGGAGGCTGAGGGTGGCAG ATCATCTGAGGTCAGGAGTTCGACACCAGACAGGCCAACATGGT GAAACCCTGTCTCTACTAAAAATAC	SEQ ID NO. 116
SG05S876	TATATACAACCTGGAAGCTCTTTTTCCAACCATATCACAGACAA AGAAATTGAGGCTTGTACAGGTGAAGGGGCCTGCCTTTCCTTTG CTCACAGGAATGTGAGGATGATACAAAAGTGAAGGATATTGGCA TTCTTCAGGCAGGGAGATAACCTGGACAGGGGTGGTGCAGCAGG CATGTGCATAAAAGGAGCAAGAGAAGCCTTCTCTGTCGTGAGCA AGCTTGCAGGCCAGATGGAGAAAAATGAAGTAAAGTCACCCCAA AGCCTGGATTCTCATCTGGAGTGCCTCTTGCCTCTTGCCCTTCC CAGAACGCTCCAGCTTGGCACTGGGCTGGAATTCCACTAAGAAT TGAGTTGATTTCGTCATCTGAGGCCCTGGGCACAATGACAAGGG	SEQ ID NO. 117

	TGGTTTTCTCGGATCTGCAGTGAGCATTACACCAGAGTGTGGGA AACAGTGCCTACTCAGGGACCCCACTCTGGGACCCAGGGCAAAC TTGCCATCGTCTCCAGTCAGCTCATTAGCCGCCCAGGACTCTGC CAGCCCATCCAGGCAGTGATGTAATTACCAAAATGGAGATGAAT ATTTAAAGGGACTCTTACTTAACCGATATACTTCCTCTCCAAGT TCCCTCCTTCACCGGCTCTGGATGAATTTCTGGAGGGATTGCTC TGACATAGGCCCAGAGCTACCTGTGGTTTGACCTCATCATGAGG CCTTTCTTCACCCTTTCTTGGTGGCTTGCCTTGAGGGTGTTAGG AGATGGTCCATTGTCTGACTGTGAACAGCAGGGCAGCTCTTATA TTCTCCATCAATGGATCTCTGGGGACAAGACCCAGATGGGTGGG GGGACAGGGGAAGGAAACATAAAAGCCAAAGGGACTGGATACCT GTAACTAATTACCCCTTTACTGTTTCTGTCACCAGACCTTAGTG CCACAAAGGATTGGGGGTCATTTGTGACAATGTATGTTGTAAAA TGTAAAATGCAAGTGACCACAAATCTGAAAGC [A/G] GTATAGA GCTTTGGTTAAAATAATGCAGGCTCTCCACTGGCATTATTATTG TTGTTAGGAGAGTCTGGTGCTCTGTTCAAGGGCTTTTCTGTGCT ATGGATTATCTCTGTTTAGCACAAAATATCTTGTGTCCCTGGAA ACCCCTTAGTCCTGAGAAAACCAGGGCAGTTGGTCACCCCCCTG TTCAATGCAGGCATCAGTTCCACTAGGTAGGGGGTCTTAGCTGC ATTTTAAAGATAAGGAAATAAAGACTTAATGGGTTGGAATAACT GGGTTATGTGCACATAGCTAAAGAATGGTTACACAAACAACTTC AAGTCAAATATTAGACCTGCGTATTCCTAAAATCCCTATGGCTG TTTGCAATAACTTGAGGCCAGCCTCCCTCTCCTCTTTTCTAAGC CCTCTTTACCTTTCTGTGTCCTCTGATGGCTGTTGTTTATCAAG GCAACCATCGTGATTCATACCTCAAAGCACGCTTTGAATTCTAC TCCTATAGGCTCCAAAACCCTTATTATCCAGGTTCAGTATTGCT CTAAACTAGGTGAGGTCCTGAACAGACCCAGATTTCAAGCATAT TCAGGTGGATTTGTTTAACAGAGTGTGGCTACTGGAACATCTGG AGCCCAAAGTACACAGGAGGCAGGAGAGAGCCTACTTTCCTGAA GAGAGGGACGGGCCAACTGTCCGACAATGAGGAGGTGGGCATTC TTTCCTTTGTAAAACAAAAAGTATCTGAGACAGGGGTCAGTCAA TTCAGAAGCTTATTTTGCCAAACTTATGGACCATAACCCATGAC ACAGCCTCAAGAGGTCCTGAGAACATGTGCCCGAGGTGGCTGGG TTACATCTTGGTTTTACATGTTTGAGGGAGACTGAAGACATCAG TCAATACATGTGAGGCATACATTGGTTGGGTCCAGAAAGGCGGG ACAACTTCAGAGGTGGGGAGTGGCTTTTAGGTCATGGGTGGATT CAAAGATTTTCTGGTTGGCAATTGG	
KCP_rs95 2767	AAAAGTAGCATCGAGAATCAATTTGCATCTCAGAATTGGGATCC CTGCCCTAATCTCTCTACTTTATGCGGCCGTGTCCTGCTTTTCA TGACTCTAGAAAGCAGAGGAGAAAGTGGATGTAAGATATAAATT AGTCTGTCTTGTAGGGCTTTCTCTTGGTCCCATTCTGGGACCAG CCAGTGTCCATACCTGTGGCCTTTGGTATCCAATTTAAGGCAGT TCTTCTCTTTCCATGATCACACAGTAAAGGAGCCCCCGTATACA GTGCTCCAGGACTGAGTCCAGTTTTTAGTGTAGCGTGCAACAAG AGCAGAAAAGGCAGAGTTGGGAAGGACATGTCAACGGGCAGCAA TGAGGTGGTATAAAGACCCTGGGCATTTGGAGGCAACAGAGGGA GAAAGGTCTGCTTCAAGGACCAACTTGGTCTCTTCCTATCTCTG CCCTGGCAGCACCAGCAGCTGCACATTGGCCCTTCTTACCACTT CCATGGCAAAACCAAG [G/T] TTTCTCTACCTCGCCTAGCCGGC CCCTGCAGACTTGCTGACACAGCTGAGTGCGGAGTGCATCTAGA CCCCAACATGAGGCGCCCTTCTCTCAAAACAAATGAGCCTTCGA AACTCCAGCAAACAGTGCTAATGAATTGCCCTCGGCTTCTTAGG CATCATTTTCTCGTAATTATAATGGGAAGAAGACATGGAGTCCC ACTGAGAACGTGGAGCTAGCCTGCCCCTAGAGCAAGGCAAAATC CCTCTCTGAGGACCACACTCAAGCAGAACTGATTTTTCTAAGAC TTAGAGAAGAAACAAAATCTGATTTAATTCTTAGGAAATTGCTT TTTTTAACCCACCTGTGTAAGCCTGTATTTAAATGCTAATATAT	SEQ ID NO. 118

	TTGGCCTGCCGGGATGCCACATTTATTTTCTTCCTTAGCAGCAA CAAAAATCATTTATTTATGAGAATTCTAGCTCCTACCTGCTCTC CTGAGTTCCTCATCTTCATTTCCATCTACCAGCTGGA	
KNB_2422 2	GAGGGGTTTTTAAGATTGTGTGTTCTGAATGGCCTGTCTCTGAC TGGAACCCAACTCCGTCCCCAGACCCACTTCCATCTTTTTCTGT GAGGGGGACACACTCTTTCAACTTTTCCAAAATGGCATCTACCA TGGCTTTTCTGATTAAAAGCAAACGAAACACACCCTTCCTATAA TCAAAAATTTAGAAAAGCAGCAAAAATAAAAAGGGGATAAGGAA GAAAACAGAAATTAACCACCATCCC [A/G] CCGCTAAAATTTTG ATGAGTTCTCATGTGTTTCCTTNCAGCTGATTGTTGTTTGGCAT ACATTTATTAA	SEQ ID NO. 119
KNB_2425 9	CACTTCCATCTTTTTCTGTGAGGGGGACACACTCTTTCAACTTT TCCAAAATGGCATCTACCATGGCTTTTCTGATTAAAAGCAAACG AAACACACCCTTCCTATAATCAAAAATTTAGAAAAGCAGCAAAA ATAAAAAGGGGATAAGGAAGAAAACAGAAATTAACCACCATCCC NCCGCTAAAATTTTGATGAGTTCTCATGTGTTTCCTT [A/G] CA GCTGATTGTTGTTTGGCATACATTTATTAATATTGGAATTAAAA ATATATATGGCACTTTATATCCTAGAAAATAGTAATACTGTAAA TGTGTTCTAGAAATGGAGCTGCTGTTGCTCTTATTAGAGAATT CAAACAAAGAAGGGAGGCTCGCTGGGGACAGCTTCTGGGGGAGG ATGGGTACCGCTTTGAGACA	SEQ ID NO. 120
KNB_2472 8	AGGTATGAGTCAGTTGAGTGGGGACAGGTAATAGAGAGCTAGAA CTGGCTGGCCTTATGGCCTCCAAGGCATTGGGGAGCCACTGTAC ATTCTTGAGCAGGCAATGACTTCACAAAAGGATTTCTCAAAGGT TAGTCCTGCAACAGAAGACAGCGTGGATTGGACTGGAAGAGTGG GAGGGCAGGTGGAGAAGGCATTG [G/T] CTGCAAGTGGGGAGCA GCCCTGGGGGCCCAGCCAGTCCCCTGTGCCCTGACAAGTGGTAT GGCATGGATGGATGGCTCTACTTCTGGGCCGCCAGGATGGACAG GTACTGGTTGCTCTTCACCATGGCGATAATGAGGAGGCCACCGG TCAGCAGGAAGGTGGGCCAGAAGAGGGAGAAGAGGAGGGCCTGG GGCCCGTAGAGGCGCTGGAAT	SEQ ID NO: 121
KNB_2989 5	CCCCATCCCTCCAGTTCAGTACCTGCTGGTTCTGGTCCCGAGTG TCCTCCGTGTGGTACAGCACAGCCCACCTGCCGGCAGCTGACAC GTTGACCCACAGGCATGGGTACTGGGGCACCTTCTTGCCCTTCA GCT [C/T] CTCCTGGTCCCTGATGTTGGTCTCAATCAGGTGGCA CTTGGATTCCTGGGTCCACACGCTGAGGAGACCACACACATGCA CACATACACATCTCAGAACTGGGTGACACACAGAACACCCATTT GAACCCATTATCCCCTGGGAGCCTCTAGAGGGATCCAGGACTGG GCTCCTCATCTTGTCTTCAGCATCCAGCAATAAAGGCACAT	SEQ ID NO. 122
KNB_3149 7	TTCCCTGCACTTGAACCCTAGAACCTAAGAATGAGCATCGTCTT GACCCTGCTGCCTTGAATGAGGGTCAAGGAGAGGGGTGAGTAGA AGGCCAGGGTTCCTTACAGATGCCAGACCCTTAGGAGAGGGTTG GGGGGTGGGCAGGCCNGGAGAGCTCAGTACCTTTTCTGGTAGAG GGGCAGCACAGTCGTGACCAGGATGTAGTAGGTGATGACGGCAC ACACCACCATGGTTACACCCAG [A/G] CAAAGGGCTCGTGTCTC TCCCCGCTTCTGGGCCATCACCAGCTTCTTCACCATATTCACTG GGGGCAGTGATCATTTCTAGGTCCACAGAAGCAAACAGAAGTGA GATCAGCCCAGTTCACAGGTGATCCACAGAAAGAGAGGACAGGT GAGAGGGGAAGGTACTCAACTATTAATATCACTCTTGTTTATAT TTGGAGCTTTGCAACTTCCAGAAGTCTTGCTTTTTGGACCCCAT GTA	SEQ ID NO. 123
KNB_3529 8	AGAGGAAGGGAGTCCTCCTGCCTGCCTCCCTCCCTGCCCCGTGG CAGGCTGCTTTCCCC [A/T] GTCTCCCTCCAGCCCGGTCTTCAG AGAAATCACTTCCCAAGTGCTTTCAGGCCCGGTACTCACAGTCT TCCCGGCGTCCTGTGGGTCTTGAGCAGCAGACAGTTTCTTTCTG CCTGGACCC	SEQ ID NO. 124
KNB_3537	AGCCCGGTCTTCAGAGAAATCACTTCCCAAGTGCTTTCAGGCCC	SEQ ID

0	GGTACTCACAGTCTTCC [C/G] GGCGTCCTGTGGGTCTTGAGCA GCAGACAGTTTCTTTCTGCCTGGACCCCCGCCCCCACCCCAAAA GAGGCCACAGAGCTTCA	NO. 125
KNB_35399	AGCCCGGTCTTCAGAGAAATCACTTCCCAAGTGCTTTCAGGCCC GGTACTCACAGTCTTCCCGGCGTCCTGTGGGTCTTGAGCAGCAG AC [A/G] GTTTCTTTCTGCCTGGACCCCCGCCCCCACCCCAAAA GAGGCCACAGAGCTTCA	SEQ ID NO. 126
KCP_rs314129	CTTATCTCCACCCTTCACTTGACCCAAGAATCAAAGAACCTGAA ACTGAGACTTGGAGGCTTGAAGTCACTGGTGCAACCGTAGGGGC CAGAACTAGATTCGAAGCTGGCCCTTCCAGATGGCACAGCTTGG TCTGTCTCTGATGACCCTGGGGCTGCTCTGAGACATTAAAAATC ACCTCGATCATACAGTAAGCTGCCACCTGAGGCTCTGGAGGTCA CCCTGAGTTTCCCCAGCCCCCAGGGAGGTGGGTGCAGCCTGGCC TTCCCTGCTGAGCGAGCTCACCACCTTCCTCCCTCCTGCCTCCA GCAGGCGCGAAATGAAGGCAGCCACTCAGGCCTCCCTGACACAC TCTCAGGCGGTGAGTGCCCTTCTCCACCCCTTTCCTAATTGAAT CTTATTAACAGGAGACTACAGTGTCTGTTTAATGGGCACCATAG CACCAGAGGGTCTAAGACCAGCTTCAGACCTTGCAGGCAGATTG ACAGAGGGATGTAGGA [C/T] CTGGAATTCAATCTCAGAAGAGC AATTTTCCAAGGATGATCCTCTGTCCACTCAGAAGCAGGAAAAG TCCTCCTGGGGCTAATCCAGAAATGCCAGGCCCCCCTCCTGCTT CCCTGGGGGAGAGATACACAGTGCAACAGGCTGCCATTTATGAG TATAACCGAAGGGCTCCTTGCTCGTGATACTCTGAATAAGTTAT TAAGGGCTACATATTATTTGGAAATCATAAACAAACTTTAGCAT TCTTCCCAAGGGAAGGTGGGAACAAACAGGGAAGGGGGGCCGTG GGGTCTTCTGCTCCCCCTAAATGAGCCACAACCAAAAGGCATTG ACAAGCCCTGTCCTCGAGGGTTTGTGGGTGAAAACCCAGGTCCT TTGCTGGCTGCGGGGTTGTGTGTGACAGATGGCTACAGGTGGAG GGCAAGAAAATAACAATGCTGCAACAATAAATATTGACGGTTTG CATTAGTACGGGGTGTCAGAGATCACAAAATATCTTC	SEQ ID NO. 127
KCP_rs183398	TACTTTTCAGCCTGAGGTCTCCTCCTCACCACTAACACCCTTCC CTCCAATCAAACTGATCCATTGTACCTACAAAAAGCCCGTCCCA CCTCCTAGCCTTTGTTCACACTGGGTTCTCTGCTGGATCACCAT CCCTCCACATTTCCAGGTGTCCCTCAAGACTACTCAGCAGCAGC TATCCATACAAGTTCCTCAACCCTGGCTTTCTTGCCCTCAAGTA ACCAGTTCATCCTCCCCAGTCATATAGCCCTCTATTTACATTTC TTTTCTGGAAGCTATCATTTTTCACGTGCCATTTGAGTGAGTGT CCTCGCTAAGACGATATTTTCTTTGAGGGCAGTAACCTTTCTTA TATGTCTCTGTATCCCATGAACTTAGCAAAAAACAAGGGACAGA ACAGGTGCAAAGTCTACGTGGTTAGTGAATTTAACAGATCTTCC TAACGTGTAAACGTCGTTGTCCAGGTGAATGGAAGAAGTGAGCT GAGATAGAGGGGACAGACAGAGTCAGTGTCCAGTGCTGACCTCT GAAATGGAAAAACATGGCCAGTCCTTAGGAGGCTGCAGAGGCCA AGACCCCAGTGAGGTTTGGGGGTTCCACAGCAGAGGAGGAGCTG TGGACCACAGCAGGACCCCGATGCCATCAGCAGGGGAGGAAGTA ATCAGAGAGGTGGAGGAAGGAAGCCAAGGGAAGTCAAGTAAACA CCAAATATTCCCTCCCGGTCCAATGCTGTGACCTGCATAAGCCA CCACTCCCCCAGTCTAGACTCTACCCATGGAAGAAGGAAGAAGA TAGAACTCTGGATTTGAATATAATTCTAAAATAACCAAATTTAT CTGAAAATGACTAGGCTGAGTTTTCTGCTTCAACCAGAAATGGA GCTTGGAGTCAGAAATTATGTGAAATTATAGAAGAGAAAGTCAC CATCTTCCATCTCTGAGTCGTATGATCATTTTAGACATAAAATT GTGCACTTACGATGTACCAAGTGCTTAATATA [C/T] GTGATCT CATTTCACCAGGGAAACTGTATAATTCATTGCTTTAACTGACAA AATTCTGCAACTGAAGAAGGTGCTGTTAATAATTGCATTGGGAC GCAGGCCTGAGCAGGCCATGATTTGTGGCTGTCCTACATCTGAC CCTCACAGTATCCATGGGAGAAGGCAGCATGTTTATGCCCCCTG	SEQ ID NO. 128

	ACAGCTGGGGAAACCAACACTTAAAGTGATTAAGTCACAAGTCC AAAATAAATGACAGAGCTGCAGTTCAAGCCCAGGTGGTCATTTA CCAAAGGCCATGCTCTTTTCACTTTGCATGGACTGTGACCGCT GGCTCTACCCAGCTTCCCAGTGCGACCCTTCCCCGCCCACTGTT TCTCTTCTCTGGCCAACGGAAACACAATGAGACCACATATGTAA CATTACATTTTTTCATAGCCACATTGAAAAGAAAAAGGAACCAG GTAAAATCCATTTTAATATGATATTTTATTTAACCCAATACAGT TGAGGCTTGAACAACACAGGTTTGAACTGTGTGGGTCCGCTTAC ACATGGCTTTTGTTCAGTCTCTGCCACCCCTGAGACAGCAGGGC CAGCCCCTCCTCTTCCGCCTCCTCCTCAGCCCACTCTACATGAA AACAAAGAGGATGATGATCTTTTTGATGATCCACTTTCACTTAA TAAATAGCAAATATATGTTCTCTTCTTTATGATTTCTCGTAATA ACATTTTCTTTTCTCTAGCCTCATTTACTGTAAGAATACAGCAT ATTCCCAGCTACTCAGGAAGCTGAGGCAGGAGAATCACTTGAAC CTGGGAGGCCGAGTTTGCAGTGAGCCAAAATCGCACCATTGCAC TCCAGCCTGGGCAACAAGAGCGAAACTCCAACTCAAAAAAAAAA AAAATAAAAAGAATACAGCGTATAATGCATGTAACATATAAAAT ATGTGTTAATCAACTGTCTATGTTATGGGTAAGTCTTCCAGTCA ACAGCAGGCTATTAGGAGTTAAGTT	
rs1032856	CGCTCAGCAGCCATTAAAAGGATATCATCCAGTCACTTAGTTTC TCAATTTAACTTTAAAGGAAAGTTGCCTTATTAGAGAAGTGGCC TCTATTTCAATGTAATGGTCTTTGTCACATCTTCCAATGTGCTG GCTTAGTGCTGAAGGATGGGGAAAGGCAGTTTTCACATATTGCA GCCACCATACCACCAAAGAAAACAGGTGCACTTCCAGGCATCAT TTAGCGGGGTACCA [C/G] ATTCCTGGTTCCAGTTTCCTTTTTA GAAAATCTGAAAGTAACTTTGGGGCATATCTTTTAAGGAGTACT CCAACACGACTAGTGGACAGACCCTAAATTAATTGCCAATCAGC TCTGCCTTCTGGTATTTACACCTTTATGTAATAACCTCCACTTG AAGGTAGATGAGATCTGTGACTTGCTTCTAACCAGTGGAATATG GCGGAGGTGGTGGGACGTTACTCCTGTGATTACATTACATCATG TGGCTCCTTTATGATGGAAGATTCATGCTAGAGATTCTCCTTGC TGACTTGACAAAGTATGTAACCATGATGAAGACTTCCACGTGGC AAGGAGCTGTGGGAAGCCCAGGTGCTGAGACTGGCATCCAGCAA ACACCCAGCAAGAAACAGACGTCCTTGGTTCTACACATACAGGA AATGAATTCTGCCAACATCCTGAGTAAGGCTGGAACTAGATTCT CCCCAAGTTGAGCCTGACAAGTAAAATACAGACCAGCCAACACC TTGATTGCAGTCTTGTGAGACCTGGGGAAAAGGACACAGCTGAA CCGTGTCCATTCTTCTGACCCACAGAAACTGTCACATCATAAAG GTATGTTAGTTGTTACACAGTTTAGAAAACTATTACAGCTGCTC AAGAAGGTTAGCTAGCTCCAGATTTCAATCCATTCACAGGAAAG CAAGCTTTATTCCTAGAAGAATAATTCATGCTTTGCAAAAAGAG GAAAACGTCCTGCAGTTTTAGAAGGTCTTTTCTTTCTCAACACA CCCAAATTTCTTTAAAATCCTCAAGAAGTGCATTTGTTTTCATG GTTGACTCGAAGAAGTGAGTATAATTAACTCACAAAAGGTGGGA GGAAGGGACAAATTAAATTTTGGT	SEQ ID NO. 129
KCP_rs888934	CACTCAAAGGGCTGGGGACCCTTGTCCCTCCCATGTGCATCCAT CTCTCCTATCTCTGAGTCCCCAGTGAACTGCTGCCTCCCTAGAG AAACAGTGCTAGAAGTCAGTGGCAAGAGCAGCAGGAGGACTTGG AGCTACATGCAGAGTGTGAGCTCCGGAGTCAGACCAGCTGAGTT CAAGGCCAGCTCCACCATCTATTCACTGTGACTTCAGGAAGGTT GCTTAACCTCTCTGTGCCTTAGCTGCCTCATCTATAAAACAGGA AACAATGAGAGTCTTTCCTTATGGGGCTATTGAAATGATTAAGT GAGATCAGGCATGTGATGGCACACAGTAAGAACTCCATAAACAG AGGTCACCACTGCTAATGCAATTATTCTATCACCTCAGGAGACT AAAGCAGGGGAGGAAACACCATTGACTCCTGGACATTTACCCAA GGAGATTATGGATCCATGTTTTGCACACACTTTAGAAAGACAAG	SEQ ID NO. 130

	GAATTCTAACCACAGC [A/G] TCTGTCTCCACTGCCCCCGTCAT TTCAGTCTCACCCGTCCACCCTCAACCTCACCACTGTGGCCCGG AAATGCGGTTGCCCAGGGCCACTCTCACCCCACCTCAGCCCTGC TCTGCTCAAGTCTCACTTCCACTCCTTCCAGCTCCCATCCCTTT CTACCCAGCTCCACCCTGATTTCTCCACCATGACCTTTACCCTC CTAGTCTGATCTAGACCCCTGATCTTGCCGAGTATCTAGGACTT TGGTGCCTTTGACCCTCAGCAGCAGAGGTAGAGAGGGATCTCGG TGAAGTCTGGGATGTTATAGTGACTTGTTTATCTAAGTGCCCTG AGACTGTGAGTTCCCTAATGCAGGGAGCATCAACCTCTGCAGAG AGCCCCAGAGCCCTGCTCAGGTGTGATGAACAGGAGGCACTCAC TTGATGCCCTCACAAAGTTGTGAGTGAATGAATGAATGAGTGAA TGAATGATTGAATGAAGATTAGTGATTATGTTAATGA	
rs905823	GGTGGGGGGGAGAGGGGAGGGGAGGAGAGGGGAGGGGAGTGGG GGAGAAGGGGAGAAAAGCGCAGCTGGCTTCCTCACTCTCCTTTC CTTCCTCACCATCCTTACCCTGGCCCAGGGCAGGAGGAGGATTG GCAGAGTAGAGGCAGGGTCTTCTGTCTTAGCTGGGCCTGTTGGT GACTTTCTGTTGGCCAACATGGGCTGACTGGAATGTTCTCCAGC ATGGCACATGGTCATCCAGATGCAGGCTCTTCCCTGGGGCACTA TAGCAGAGAGGGCTCTCTTCCAGTCTATTGCAGATGGATGCCCT CGTGAGCTGAGTTTTGATGAACATCCCATGTCCCCAGCCACCCC ATTCAGAGCCTCTTTCTACTCTGGTCCTCTGGTCCCAGCAGCAG CCCTCTGGGTACTGAGGGGAGGGCATCTCACCCAAGCCCCTTAA ACCTGCTCACCTTCTTCAGAGCCCACGTGGCCGCAGGAAAGTCA CAAACCCTTGTGCTCCCACAGGGCACACGTGTGCACACGTGTGC AGCTACCTTCTCTCTAGTTGGTACCTGAGGCTGCCTCCTGGATT TTCCAGTCTCTGTGTTCCCAGACA [A/C] CCCCAAGCCCCAAGA ATACAAGAGCTCTGTCACCAAGCATCGGGCCTGTGGCTGCACTA CACGTCTGCAGCTCAGGACCCCTGGCTGCGGCGTAAGCTACCAG CATCCCCTTCTCATGGGCACCCTCATCTCCGGCTCCCCATCGCT GGGCTGTGACCTGCGGGGGCGCCCCTCTATGGAAGGGAAGGAGA AAAATTCACAGTGCTATCTACTCCTCTGAATGCACTCCCACCAA TTTCCTTGGAAATTTCTAGCTTTCACTGACATATCTGGGATGGG GCGGTGGTCACAAAATCA	SEQ ID NO. 131
rs883849	CTGGCTGGGGGACCATGGGTCAGGGCTGCCACCCCCTGGCTCTG TGCCTTCACCTGTGTAACGAATGGGGCACTCACAGCCCCTCTCA AGTGGTCCTGGGGATGAAGTGAGAAGGTGACATATACAAGTGAG TTATACACGTTCCTGTTCTGTCACTCACCAGTGCTCACTGGGTG GGTCACTGAACTCCCCTCAGCGTTTCCTTCTCCATCTGTAAACC ACCAGTGCAAACCTTTCCCAGATAGTGCTGACCCGAAGCAGGAA CCAGTGCCCCTCTGCCCTCAGTAAGTCTGCCAGCAG [A/G] GGA AGCCCATAGAGGGTCTTGGGAAATGAAGCCAACAGAGTCAAGAG GGTCAGATGATGAGGGACTTCAAGTGCCACCTTCATCCCATTCT TTCTGCAAATATTCACCACACACCTACGTGACCTCAGGCTCTGT GTCAGGTCCTGGGGATGTAATGGTGTCCATGAAGAAACAAGGTC CCTGCCCTCATAGAGTGGCCTGACATATGCCCGAGGCAGTCAGC AGCCGAGTGCGGGAGACTCTTGAGCAGAGATTGAGTGTGTTGAT ATCTGTAGGCATCAGCCTGGCTTTGCTGAGTGAGCTATATCAGA GTGGAGGAAGCCAGAGGCAAAGTCCAGACTCCACTGATCCTGGA TTGAGGGGAGAAGGGGCTTGGCGGAAGAGCAGCCTGAGCACCTG CATCTCACTCCAACTGGTGCTGATTTGTTCCCAT	SEQ ID NO. 132
rs2135046	TCCACAGGTTTGATTATAAATGTGTGTATTGAATTGGAATTTCT GTTGAAATTCTGATCCCTTCTAGACAAAGAAGGTAAAAATTGAA ACATGTCAATGGATATCTAAATATCATTACTCACTGGCTTTATT TGCAAATGGCTTTCCATTGACAACAGTTACATTTTGTTCAAAGC AACAAATGATTGGCGCTGACAATCCACAGGAACATGGTGCAGTC ATTAATGAATGTGCTCATTATTCCTCCCTGCCGGGAGGCATCGA CTCCCGTTCTCCAGCCTGTTTAAGCAGACAGACCTACATCTGC	SEQ ID NO. 133

	ACCTGTCAGCTTGGAACCCTAGTAGGGGAGGGGGATGCTGATGT GATGGAGAATGAAGAATGGGCCCTGCAGGCTGACATTTTGGGAG AGTAGGTTCTGAAATTTATCCCAAAGGACATGGAATCCTGGAAG CAGGGTTCAAGATCCTCCCAAAATTGATCTCCCAGGATGCTTGG AATGATTGTTC [C/T] GAGGGTTTTGTAAAATGCCAGGGGAAAA CCAGGAAGCTTCTCTCCAGTTGTCTTGCCTCCTTCCTCTCCAGT CTCCATGGAGCTGACTTTGAGAATTAACTCCTGAGGGACAGAGA CCCTGGGATGGAGAGCCAGCCCTGCTGGATTCCACAAGGTGCTG CTTAAAGCACAACACCTCTTCCCAATGACAGGTTCTGAAAGAAG GCCTTGTAGCTAGATGCACAGAGGGTTTTGTTTTGTTTTTTTTT TTTTAACCTTTCAGCATCTGTCTAAAATTGCTCTGGGCTGGGTA CAGTGGCTCCCACCTGTAATCCCAACACTTTGAGAGCTGAGGCA GGAGGATCGCTTGAGCCCAGGCGTTCTAGACCAGCCTGGGCAAT ATAGTGAGATCTCTATGTCTAG	
rs50057	GGATCTGTGCCTGAAGCTGAGCTGCTGCAATGAAACTGACATTT CTGCCTTGCAGCCTGGCCATGGGCTTAGCTGGACTAAAATGCTG CTGCAGTGGTGAGGGCACGTGAGAGTCCCTAATGTACATGGCCT TGCTCCTTGTCCTGACACATCTTTTAGGGCTGCTGCTTTCTCTA GTGCTGGAATCTAGATAATTCCTTTCCCAGCCGTTTGTTTCTTC AATCTTGGAAAATATCTGGATGAATGTAACACTGTCACACAC [A /G] AACAGAATTATGACTTACGTCACATTCTATGTCGTGATTTT GTGGACTTTTAATAATTGCATTACATTTGTGACCATTAATTTCC ACCATCGCCCTGCTCCTGAGAATCTGTAAGGGACATTTGACACT CCTCTCCCCACCCACCTCAACATTTGTGCTGACCTGAAGGTCAC ATTAAAAA	SEQ ID NO. 134
KCP_4976	GCAACTTTCCCTGGCCTGCAGGAACTCAGGGACTCAGGGGACTA ATAACAACAGTGTATGAGCTTCCGGGCACACTGCTTCCCAGTGG CAGCCCCTGTACTTAGGGCTTTGTATGTATTAATTCATTTACTC CAATTCCCACAATAACCCTATAGGGTAGGGTTTTATTATTGATT ACCTTTTTACAGAAGAGGAGAGTAAGGCAAAGAGAGATAGAGTA GTTTTCCCAAGGTCAAAGAGCACATAAATGATAAAGGATGGATT TGAATGTAGGCAGAATGACCCTCAATACAGACTGTTCCTACAGT CCACGTCCTCAGCCACTAGACCATACGGCCACTGGGATGATAGA CAGACCACTGCAGCCATGGATAAGGCAAAAACAGGGCTGGCTGT GTTGATCTGTGTCTCTCAGAGCTCCATTCTTCCTCAAGGGGGCA CCTTGCAAAAAAAAACAAAAAAATGGGGCAGGGTAGGGAACTGA AGGCAGGAGCTCTTCA [C/T] AGAGCATAGCCACATCCTCCAGG CAGACAAGAGGACGCAGGAGGCACCATTCTGTGAGAGTATCACA GTCTGACCCAAAGACACAGCTTCACACTGTCTGATGGCTTGATG GTTAATGTCACTCTGCCTTTTCCCCTTCTCAGGACTTTGTAACC GCTCTGTCGATTTTATTGAGAGGAACTGTCCACGAGAAACTAAG GTGGACATTTAATTTGTATGACATCAACAAGGACGGATACATAA ACAAAGAGGTAAGTGAGCTGGGGCCAGGGGTGTGAGAGGGCTCC AGTGAAGGTAACTAACCCAACAGAAAACAGCCCCAGGCATGAGG ATAGCACTGTCTGAATGAGGCAGGCTCTGCTTTGGGGCTAACAG AGCTGGTCCCTGGCAAAATAAAGAAGGCCTCCCTCATTGCCCTA CCCTGCCCTGTTCCCAAGCGCCCAGAAAGGATTAAACAGATTCA TTCTCACTGGGTCACCTAGATTCAGTAGATATTACAC	SEQ ID NO. 135
KCP_5077	TAGGGCTTTGTATGTATTAATTCATTTACTCCAATTCCCACAAT AACCCTATAGGGTAGGGTTTTATTATTGATTACCTTTTTACAGA AGAGGAGAGTAAGGCAAAGAGAGATAGAGTAGTTTTCCCAAGGT CAAAGAGCACATAAATGATAAAGGATGGATTTGAATGTAGGCAG AATGACCCTCAATACAGACTGTTCCTACAGTCCACGTCCTCAGC CACTAGACCATACGGCCACTGGGATGATAGACAGACCACTGCAG CCATGGATAAGGCAAAAACAGGGCTGGCTGTGTTGATCTGTGTC TCTCAGAGCTCCATTCTTCCTCAAGGGGGCACCTTGCAAAAAAA AACAAAAAAATGGGGCAGGGTAGGGAACTGAAGGCAGGAGCTCT	SEQ ID NO. 136

	TCACAGAGCATAGCCACATCCTCCAGGCAGACAAGAGGACGCAG GAGGCACCATTCTGTGAGAGTATCACAGTCTGACCCAAAGACAC AGCTTCACACTGTCTG [A/T] TGGCTTGATGGTTAATGTCACTC TGCCTTTTCCCCTTCTCAGGACTTTGTAACCGCTCTGTCGATTT TATTGAGAGGAACTGTCCACGAGAAACTAAGGTGGACATTTAAT TTGTATGACATCAACAAGGACGGATACATAAACAAAGAGGTAAG TGAGCTGGGGCCAGGGGTGTGAGAGGGCTCCAGTGAAGGTAACT AACCCAACAGAAAACAGCCCCAGGCATGAGGATAGCACTGTCTG AATGAGGCAGGCTCTGCTTTGGGGCTAACAGAGCTGGTCCCTGG CAAAATAAAGAAGGCCTCCCTCATTGCCCTACCCTGCCCTGTTC CCAAGCGCCCAGAAAGGATTAAACAGATTCATTCTCACTGGGTC ACCTAGATTCAGTAGATATTACACAGTGGATAAAAATGACTTGT TTCAGTGTGAAGAGTTACTCTTCCCTAGGGAACCTGCATTTGGG AAGGTTAGGAGCCACAAGTCAAAGCTAAAAGTTGAAA	
KCP_241099	TTGAAAGAGAGCGCTTTGGGGGGTTTCTTACTGTATGTCTCTA TTGCATGTTCTGTATTTTACATTTTTCTATTATTTCTTCTCTGA GGTATAGTATTGAATGTAGAAAAATCCTCAAATGTTCGGTATTA AGCAATACACTTCTAATTCATGGTTCAGAGAAGAAAATATCTCG AATAAAAATAAAATAAAAATATGACTTATCAAAATTTGTAGGAT CTAAAGCAGTATTCCAGGAATGCAAGGTTGGTTTAACATTCAAT AATTGGTCAGTGTAATTAATCACATTAATAGAATAAAAAGAGAA AAAATATAATCATTTCAGTGGATGTAATTGTTCAGAGCTTCTTA AAAGAAGCAACTCACTATTTTACTAGATGATTTGTTTCTTCTGA ATTCCTCTTTAAGGCTACAGGTGGTGCTTCTTACTTTGAACTGA TCACTTTCTAGGTCCCCACCCTTACTTCTTGTTTTTCATACCCT TGTAGAGTTTTCTCCA [C/T] ATAGGAAACCCATGCTTGACATT TGCTCACCAGAGTTACAGAGCTCTCAGGGAGGAGACTCAGAGTT CTAACCCTCTTGCCCTCCTTTTTCCCAGGACGACAACATCATG AGGTCTCTCCAGCTGTTTCAAAATGTCATGTAACTGGTGACACT CAGCCATTCAGCTCTCAGAGACATTGTACTAAACAACCACCTTA ACACCCTGATCTGCCCTTGTTCTGATTTTACACACCAACTCTTG GGACAGAAACACCTTTTACACTTTGGAAGAATTCTCTGCTGAAG ACTTTCTATGGAACCCAGCATCATGTGGCTCAGTCTCTGATTGC CAACTCTTCCTCTTTCTTCTTCTTGAGAGAGACAAGATGAAATT TGAGTTTGTTTTGGAAGCATGCTCATCTCCTCACACTGCTGCCC TATGGAAGGTCCCTCTGCTTAAGCTTAAACAGTAGTGCACAAAA TATGCTGCTTACGTGCCCCCAGCCCACTGCCTCCAAG	SEQ ID NO. 137
rs1895301	TTTTTTTTCCCCAATCATGCTGTATTCTTAGCGTAATTTTAAAA TACTTAAAACAAGATCATGAGAAAATAAATGCCCAGATTCTAGC ACCAAAATTCAGAAGGGGGGGCTATGAGAATGAGGGCGGGGAG AAGCCTTCCTGAGAGTTTCTAAGAGGCATGGAGGCAGTGGGGAT AGTGATTAGCTCTGGGGGAAGAAGAGGCTACTGGCTGGAAAAGG GCATGAGGTAGGGTTGGTAATCACCTA [C/T] TGTTTTATCTGA GTGCTGGTCACACAGATGTGTTCACTTTAGGAAAATGTATTGAG ATTACACTTGTGATTTCTGCATTTTTACATACGCACATTAACTc agtcatatgctgataaatgtttaacaatgggtttgctggagaaa aaagggtcccccggatttgtaatgtctgcccatttccgtggtgt aaatactcccttcacaactgatttcaagcttcccatgcactgta actgaagacagagttgggaagatacgtgcagtagcacaacatta aatcatatttccaccatatacacacaataggtgtaaataacacc cagagcatagaaaa	SEQ ID NO. 138
rs1422752	GGTTGGCAGCTTTTAATAACTTAGAAATGGCTGGGGGTGGGGGG GAGGAAGTACTGAATCATTTACTCATTCAGCAAATAACCAGGGA ATACCTACTCTACACTGGTCACTGATGGAGATA [C/T] AGACTT GGGCAAAAGCCGCGTCATCTGGTTGTGTTCAAGCTGAACATTCC CTTGACCCAGTCACTGATGGAGATATAGACAGGCAAAAGCCACG TCATCTGGCTGTGTTCAAGCTGAACAGTCCCTTGACCCAGGGCC	SEQ ID NO. 139

	CATGACAGGGCAGAGGGCAtattattatccccattttacaaagg aaagagctgtcagacacagTGTCACACAGGAAGGTAGACGATAA TGTCAATATCCCTCATCTTAGTATAAAGTTGTCCTTAAAAACTC TCCATTATTTATTAATTTATTGACTCACTTATTCATGTTTTCTG CACAGTGATACTTATCCTGCACGAGACTCTCACACCAGTGCTTT GGGTGTAAGAACACCCCAAGGATTGTGTTCCCTTTTCTCGAAGA GTCTGTGGTCTAAGGGGATTCAATGGGGTCCACTTTCCAAACCA AGACAGCAAAGGAACACTAGGAGAGAAGTATTCTGTGCAGAGAT TCAGTTAT	
rs1422754	GGATTAacaggcatgcaccaccgcacctggctaattttgtatt tttagtagagatggtgtttcaccatgttggccag[A/G]atggt catgatctcttgaccttgggttctacccacctcagcctcccaaa gtgctgagattacaggtgtgagccgctgcacccggGCAACTGGT TTCCTTTTACTGCCACTTTCACTAACCGTGGTATTTCTCCATGG GCAGCATTCTTGGCATTTGGGTGTGTAGGACTGTCCCTCACATA GTGACCTCTTACTCATGAATTGCCAGTGTCACATTCAGATTCTT ATGGCAACCAGAAGCTCCCCTGCTCCCAGCATTTCTGGACTCAG CCTGGGCTGGGGAGGTTAGCTCAGACCAAATATCTCCTTTCTGC CAGTTGCTCTGCTAGGCCCAGGTCATGCTGAGCAGAGCAAGATG TAGCTGAAAACCAAATAAGTCACGTGTTCCAGCTTGCTGGGGTT TTGTGAAGAAAGCAGCCACCCCTCCAGTCATATAGTTTGCAGGT TGGGATTTGCATT	SEQ ID NO. 140
rs2055606	tggctattgtcttaagctactattaccttcttgcttgtcaagtt gcgcatttacttttcaaggcttgctacgtgcctggaatttctag attttcctttatttccatgcttggggagaggagtgcctggcagg ctcctaagaggggtctgtgctccatctcGCCCCCTATCTTGAAC TATCGGTTGGGTGCTCTAGAATCTGTATGGGGTGGAAGTGTTCA TTCATTTTCTGTACAAAAGCAATCAATGCTTATTGTGGAAAACC CAAATAAGAGAGTTGCTCTAAACAACACCCTCCCCAGTCCCAAT ACCTTGTCCAGAAGAAACCACTGTTTGGTGAGTATATTAGT[C/T]AATGTCTGCAGACCAGATCGGATGACCAAGTTTTCCATAAAT GGATGGCCATCCACTTCCCTTCAAGGGCGAGGGTAGTTTGTTCT GATCCATCTCCCTGTTTCACAGCTCAGGGAGGGAGGAAGACCCA GGAAGGAGAGCTGCCACAGTTACTAGTGGCCCAGCTGGGATTTA AAGTCCGCCGTGACTGAAGCTTGGCTCCACATGCCAGTCTGCAA GGCCCTGAGTGCCCTCAGCAGTAATTCCAAGCAAAGCAGGGAAG CAGCGGGCCAGGTGCTGAACTGAACTGCTGCTCAGGGCTCCTG	SEQ ID NO. 141
rs933656	CTGCATATGTTCCCCCAGGTATTTGCCCCCGAAGCACAGTCATC TCACTGCCTTGCATAGTGGAATGCTAATCAGCAGAAGACCCTTC TATGGGAGGCAGCTTGGAAACCTGGAGGAAGCCCTGGCTGAGGA GGCTAGTGGTCAGGGAGCCTATCCTGGCCAGGTCACTTTTCCCC ACTGGGGCCTCGGTTTCTTCTTTGTAAAGGGAGAAACTTACATT AGGCATTTCCTCAGGTTCCATTTGGTTCTCAAATTCTAATATTT TTATGGTTGATGCTCTCACCAGAGCTGCTGCTATGATCTCAGAG ACGTGAGGCTCAGATCTAATTAGAAGCAACCGGAAGAGAGCAGT TGGGATTTTTCAactcaggaatcagtctccctgctgggttcaaa ttcaggctctgccacttacagctgtatgacTAAGCCTTGTTTTC CTCAACTATAAAACAG[A/G]GATAGTAGTAGTTACCATCTTAA AATAGCTGTTGTGTTGTGTGGATTTCAAGGATCATGCAAGTCAA GCATTTAGCACAGTCTCTGCTACATAAGTGGTCAGCAAATTTGA GGTACTATTC	SEQ ID NO. 142
rs2339091	AGACCCTTCTATGGGAGGCAGCTTGGAAACCTGGAGGAAGCCCT GGCTGAGGAGGCTAGTGGTCAGGGAGCCTATCCTGGCCAGGTCA CTTTTCCCCACTGGGGCCTCGGTTTCTTCTTTGTAAAGGGAGAA ACTTACATTAGGCATTTCCTCAGGTTCCATTTGGTTCTCAAATT CTAATATTTTTATGGTTGATGCTCTCACCAGAGCTGCTGCTATG	SEQ ID NO. 143

	ATCTCAGAGACGTGAGGCTCAGATCTAATTAGAAGCAACCGGAA GAGAGCAGTTGGGATTTTTCAactcaggaatcagtctccctgct gggttcaaattcaggctctgccacttactagctgtatgacTAAG CCTTGTTTTCCTCAACTATAAAACAGAGATAGTAGTAGTTACCA TCTTAAAATAGCTGTTGTGTTGTGTGGATTTCAAGGATCATGCA AGTCAAGCATTTAGCACAGTCTCTGCTACATAAGTGGTCAGCAA ATTT [G/T] AGGTACTATTCAATTTATGGCTCTATTGTTTGGGG CTTCCAAATGTCCAGAGTAAGGCCATTTTCGAAGTAGGCAGTAC ATCTGAGAGCCTTAACAGCTCATTTCTGGAAACCTTATCCAGCC CTATCCAGATAACTAGGACCAAAAACCCCAGCACACAGATGCTC GTCCCTTGCTTCAACCCTCACTGACCTCTACTCTGTGGCTTGTC CTGAAAACATCAAAGCCTGCTCAATTAAAATCCTGAATGCCTTG ATAATACAATTTAGAAACATACATAGTTTTTAAATAGGGCAAAA ACTCTGCATGATTAGTGCTGCAAGAAGATATCCAGCCCAACCTG GGTGTTCAGGGAGCGCTCTCTAAAGGCAACAGAAATCTAAAGTA ATTTAAGAGCCATGCCACTGAATAAAAATATTCAGGTTCATTTC CTGTCCTTCTCTCTGTTTGGGATCTTTGTGTGTCTTTAATTAAA AGTAGGAGAGCCCTGCTTTT	
rs186233 1	ACTACTTCTAAAGCCTCTTAGACCCTGGTAATCTTCCTCCTAAC ACCATCGGGTGACTGCAAAGCACTGCAGGCCAGACTTCAGTTCT GCTGTGTAATTTGCAAGCTGGGTGACCTTCCTTATCTATAGAAT GGGCTCT [C/T] CTGCATGGCTGGCATGAGGAATAAACAAAATG GTTGTGTCCAGTGCCTGGGGCATAGCACAGCTCAAAAAACTTAG TTCATCCTCCTGAGGGATCAAGAAGATACTTGGAAACAAATGTC CAAGGGCGTAATCTTGAAGGGGCTTGTGCCAGGCATATATGGAG AGAAGGGTTTTGTGGGATGTCAGACTTAATAGTGCCCTTTACTC CCCACCCCCGTCTCTCTGTTCATAGACAGGAAATCTGTGGCCTA TTCTGGGACCTCAAAGTGCCACAGGGTTAAAGATACCAAGTCAG AAATCTAAGGTTCTAAATGGACTTTAGACCATTTTTCATTTGGG AAGGAAGAATTCTTTAAGGGGTTGTGCTGGCGCTGTCTCTGTAT GCATGTGCAGAATGTGCTTCCAGATGGGGTAATGGTCTGAGTTT GAGGACAGAAGTCCACTCCACTGCATTC	SEQ ID NO. 144
rs233913 9	GGGTGTGGCCTTTGGACAGCACCTTAGCAGGAATGTGGTGGAGA GCAGCCCCATTCACTCCAGAGGAGAGCCTCAAACTCTTCAGGCA GATCTAGCCTAGGTAGAATCTTGGCCTGGCCCCTCCGGGATGAC AGGTGCCATTGCCCAAGAATGGGGAAAAGGCTGAAGTGCTCCAG CCAAAGACCCCAATTTATCTTCAGGACAATTTTCACTGGAAACC TTGCCTCACCACTGCCCACTTTTTCAGAAGTAATTAGAATGCTA ATCTATAAGAAAGATGACtattaaaaataaattaataataGATA ATACATTTTGGCTTACAATTTTGAATAATATAGCCATCCCATCT TAAAGTAAAAATTCATATATTTTTAATAAGCCTGAGACATGTTT TCCAATGAACCACAGATGGTTCATTTTTATTATCCTATAAAGAG ACATTATGGGCAAGTGTTTTTTAAAATGGTAAAACAGAACCTTA GAGCAGCTCTCTTTTG [A/G] AGATCTCTAAGCACTTTCTAAGC ATCAGGACCCCCTTCTGTCATCACAGAGACTGAAATGAGGAGAT GGTCTCTGTCACCCCCTCACTCACCAGTGAGCCCCAGACCTTCA TCCCTGATCAGATGGAAGCAGTGTGGCATGATTACAGTTCATAT TTCAACTCTGCCACTCAATGACTAATAGCCAAGCACTAATAATG CAGAAAATGTAAATTTAAAAAATAATCTTCCTGAGATTGGTTAT GAAATGCACTCAACACAGCACCATCCACAGAGAGGTTCTTTTTA ATTGCTCTTTTCTTTCCTCTCGACACCCAGAATCACAAAGCATG CCTGAAAGCGTCACACATATATGTCTGTGACCATAACATGGCAT TGCACATGCAAAGGAAATAAATAGGTGTTACCCATGTGACAAAG GTCCATGAGCTCTGTCCGCAAAAAGCTGTTGAGTTTAAAGAACA AATAATTCTGAAAAATCTTCCAG	SEQ ID NO. 145
rs872435	CTGCCATTCTGATCACTGCAAGACCCCCACCCCCAATACTCCCA ATTGTACCACCCCACCCCACTCACCAGTGTCTCAGAAATGCCTC	SEQ ID NO. 146

	CTCCAGAAGGAAGGCATCCTGTCTAACCCACTGCTTCTAGCCAA GCTGTCTTTCTTCAGAAGGTAGAAAAA [G/T] ATTGTTAGTCAT TGTTTAATCTTTATTGAGTATATACCGCCACACCAATTGCACTG CCATTCATTATCTCATTTAAATCTGACAAGAGCCTTGTAAAGTA GGGATTATTCCCACCATTTCCCAGATGTTGAAACTGAAATTGAT AAACACGACATGTTGCCATGGCTACATGAAGATCTCCAAGCCGG AGGATCTCCACCCTCACCTGCCTAGCTTCCCAGACCTCTCTGCA GAAAAGGGACTGACCCCCAAGACAGCCCTGGCCTCTGGGCTCCA CCCCTTCCACATCCATCCCAGGGCCGCTGAGGACTGAAGAGTTC TCCACGTTTGCCCTTTAAAGTGACTTAAAAATAATCTTTATGAA TTTCTTCATATACAAAATTTGTACTTACTCATTGCAGCAAATTT AGAAAATACACATAAGCAAAAAAGAACGTAACAGCCATCCATAA CCCTAACTCTCAGAGATCACCACTATTAAAATGTTTATTATCTA AGAGAGAGATGATATAGACAAAGATGAGACAGATTGACACAGAC AAGATGGGTACATGATAGATATTTTCTGTGTTATAACCCTTGCT TTTTCTTGCACTTTCTAGAATTTTTCTGAGAACTAATCTGAAAT CTGCACAGGGTCCCCACGTTTGGATCCTCTATCCCATTGCCTTC CA	
rs329468	AGCTGAGCCCCAGGGCTCCCCCATGAGTGGGGAGGAAACTCATG AGTGCCTTCTATATGCCAGCGCTCTATCTGCAGGGGTTCTTTTG ATAGCAGCAGACTGAGAGATGATGTTACTGTCCCCTTTTTCCTG TTGTTGGCAACTGAGACTCAGAGGATGGAAGTGACTTGCTCAGG TCCACCACCTCTTCAGCTGTGGAGCTGCGACAGGAGCCTTTGTT TGACTTCAAAGCTCACCATCACTCCTCTCTCACTGATGCTCAAG TGGGCTATCACCTCGCCTTTCCTGAGCCTTCCTTCGCTATCCTA AAACAGCGCCTCCCGaaatcaccactaaagaacttattcatgta accaaacaccagcggttcccctaaaaacctatggaaataaaAAT TAAAAATAAAAACAGTgcctcccatgacccatgtctctccagtc ccataactctgctctatttccattcacagctccatccccacctt tatgtcttttgttcactgctttatccccagtgcctagaagagtg cttggcacctagtagacactcagtaagtatttgtcgaatgagtt aatAAGGTTGTGAAAAGAACGTTAGATTACTGGAAGGATTCATC TGAGTTTAATTCTGCTATGCTGGGAATCCAGTGTGCGGCCTTGG ATGA [A/G] GCCAGTTCCCTCCCTGGGCCCCAGTAGCCACATCT GTACATTTAGAGGGCAGGAGAAAAGCCACACGCTCTGTGACTTA TACAACTTGTTGCCCAGAGTGGAGGCTGCTTTGATGCTCAGAAA AAAGAAACAAACATGGAAATGCTAAATGGGTGGCAGAGAGCTTG AGGGAGGAAGGAGATGGGGAGGGTACTCTTGAAACTGTTTGGTG TCTTCCCTCCTGCCCCCTCAGTACCAA	SEQ ID NO. 147
rs50364	GCCTGACAGATTTTTACTGAAGGGTGCACATTGGAATAAAAAAT GTGTTACCTATCTGGTTGAGTCTTCAGCTTCAGAAAGGTAATAG AGCAAAGGCAGATAAATCCAAACAGGGACTGAGCTGTTTTCATG CAGGCTGCCTTGGTAGCTCTCCAAAGCCTTCAAAAATGATGAGA TTTTTTTTTAAATCCTTTTTATCC [A/G] GTTGTTCTCAAGGGA TTCCACCCCTGCATAGGAGAGCTCACCATTCCTGGGATCTTCAG CTTCTATGCCTTTGCATATGCTCTTCCCTTGTTCCctcattctt caacactcaactgaattatcacctcccttgaagccttctctgac atcccTTCTAGTCCCATGCCACCCAGGAGGCACTAAGAGCTTCC TCCCCTCAGCTCCCAGTTCTTAAACATGTCAACACTGTTTTGAA ATGATTTGCCAATGAAAAATTCTAGACCAGCAACCAACAAcatc cttcccaaaggtgtgttatatatggtacatgctctatgtgctaa acaccaaattcattgataacagctaagaaccaggaaacaaacca tcgttaattatggcatctcttgaaaaatctaaagatctggactc actgggcttaaatgactgcatgataacaactggttgagtaacaa ctgtttccctttcatggagcagttactctccagttctcagttcc taccactctctatagttgtacactcatcatctgtcctcatctga attacctgccaatgactactggcatttgagtttctaatccatgG	SEQ ID NO. 148

	TCTATGTGTATGCCTCCTCACCAGTGTGAGAACTCATGTAAACA GGTATTATGTCTTTTCATCTCTCTCCTAA	
rs155158 3	ATAATGGTCACGTTGGAGCAATTGCCATTTCAAATCATTAGGAA CACTCAGGTCACTTTGGCATGGAGCTATTTTGTAAAAGACGTAG AAGCCATTTATAAACTTTGGTTTGCTTTTTAAAAATTTATTTCA TTCTGAGGCTTATCCGTGTAAAATTACCAAAATGATTGTGGTTA GACTCTACATTGTCACAGTATTTAAATGTGCACAATATTCCACT TAGAAATAATGTCAGTACTAAAAGTAGTAGAGGGCTTTGATAGC AATATTAATACATCGTTAAGCCCTTCTCATTAAACAGTGTAATA GTCTTGTTGAAGTTTGTTAGGCATTTTAACCACTACTAATTAAA AATAGACCTACTGACTAGTCTGTTTTACTGTGCTTTATTGTGTC TTGGATGTTCATTCAGATACTTTTGCTGTTGAGAAATCAAATCG TCTCTTATGGTTTTAATTACAAAATACATATTAGAGGATACAG TTCTTAGGGCTGTGATTTTTAATTTGTGTAACCTTTTTTTATTT TGGAAAGGAAATTTCAGATTTTTTCTAGTAATTTTTCATTTGTG AGTGTTGTTTTCTAGATACAGAAAATGTACCTAGATAGATGATC ACATTTTAGGATATTTTGCTTACGTGTTATTTTATATTTATATA CTATAATACCATTGTATAGTTCAGAACAAGAAAATATCTTGATA AATCATCTGCTACTGTGAGGCAGTTAAAAAAATTTGAGGCTCAC TGAAAATGTGTGACTTGCCCACTGTCTCATATTGCTAGTATTGG AGAGAAAACTAGAATCTAGGCCTTTATTTTCCTGATGTAATGAT TTTAGCTAATTATTATTTATTTTCTTAAATCATTGCATTAATT [C/G] ATTTTTCACAAGTAGAGCCTATATCAGTGTTTGCaataat taaattttaagtatatttctataattgtaaataaaatCCTGACA TTTGTTACAGGATGGGGTTTTCTTTCATCatatttttataataa aaattaaGCAGTTATAAAAATAAATAGCCTAGTTTTTCAATTGG TATAAGCTGGCTTTATTTTATACTGCTAATAAAGGCACATTATG TTCAAGCA	SEQ ID NO. 149
rs145769 2	CttatatattcattaattaataatttatattCACACAATGATTG TAGAAATGTGAGTGTTTCTTAGATTACCAAACATCTGTGAAATC GTGAAGGAGTATTGAAATTTAGTAATTTGGTTTGGATCTTTGAA GATATTCTGTAGAATTGTTTTCCAAAAGTTACAACTGGTTTACA ATTTTTTTCTTAATTGCCATTAACAAGTTTTGACCCTGAGATGA GAAATTATTCACAAATTTCAATTAAATACTGGAATGCTTCATAT TTTCTGTACTTTAGGAcagggatccccaacccccaggccacagg ttggtactggtttgtgacctgttaggacctggactacatggcag gaggtgagcggtgcgtgagaa [A/G] cattactgcctgagctcc acctcctgtcagcgacagcattagattctcataggaggacggac cttattgggaacacacacaagagatctaggttgcggactcctca tgagactctaatgcctatgatctgaggtgggacagttttatcct gaagctcccccactatccgtccagngaaaaatttggtcccttgt gccaaaaacactggggacctctgCTT	SEQ ID NO. 150
KCP_1035 5	AGGGCTGGGCGTCCCCGCCCCCACCGTGCAGCCCTCGCCCCCG CCCCGCCCCTCCGTAGTTGCCCGCCCGCCGCCCCCTCCGCCGCC CCCTCCGCCGCTCCGACTCTCGCCCCGAGCGCTGGCAGCAGGCA GCAGGCAGCAGGCGGGCGCGCTGTGGCTCCGCGCCGCGCGGTCC GGGCTCTGTTCATTCATGATTGGTACTCGGCCCTCCGAGACCCA GCCCGAGCGCAGGGAGGGGAGCCGAGTGTGCGGCAGGAGGGGCG GGCGGACGGCGGCTCCCGCACCGCACGCGGCGCTGGCTCGGCAG CCTCGGCCGGGCGGCCGCTCTGGCCCCGTGTCCAGTGCCAGGCA GGCTTCAGGGCACCGTCCTCGGCCCTGGGCGAGGGAACCGCCGG GCCGGGTCCTCGCGCGGGGAAGCGGTTCCGAAGGCTCGCGGGGA GCGGCTAGCCCTGAGTCCCTGCATGTGCGGGGCTGAAGAAGGAA GCCAGAAGCCTCCTAGCCTCGCCTCCACGCTTGCTGAATACCAA GCTGCAGGCGAGCTGCCGGGCGCTTTTCTCTCCTCCAATTCAGA GTAGACAAACCACGGGGATTTCTTTCCAGGGTAGGGGAGGGGCC GGGCCCGGGGTCCCAACTCGCACTCAAGTCTTCGCTGCCATGGG	SEQ ID NO. 151

	GGCCGTCATGGGCACCTTCTCATCTCTGCAAACCAAACAAAGGC GACCCTCGAAAGGTAAGCCACCTTCTTCCTTTTGTTCCCCTGTC TGGGCTTGGGGGTGCTAGGCGCCGAGGTGGGCTGTGCCACCTGC CTCCCTTAGTCCGGACTCTCCTCTCCACGAGGAGCCCGGACAGG TGCTTGTATCCAAAGGAGAGAGAAATCGGCGGGAGGGCTGGTGT GAACACCCAGAGGAGGGAGCCGGAGTGGACGTCTGCCCCAGCGG CAACTGGACCCCTCTGGGGCACCAGGTGTCGGGACTCTCCTCCT GGGGAAATCTCTGAGAGCCGAAGGAAGCGGCA [A/T] GTTCACA GGTGGGGGTGACCGGATTCTCTGGTGGAAGTGTGGTGAAGCTCT TCCCATTCCCATGACAGCTGGCGTTTGAGCACTCAGTGAGGGTG CTGCCACACTCCCACACTCCTCCTAGGCGGCTATGCCAGGTGCA GACCTGCGAGTCCCTTCATCAGGAAGAGTGCTCTGTCTGCACCC CCAAAACCTCTGCAAGCCAAAAGGAATCAGCTGCTGCCAGGGGT AAAACTCCCAGGCCTCATGTCCTGGTGGCTCCGGGAGTCAGGAG GAGCAACCGTGAAGGGCTGGCTGCGAGCTGAGCTTACATCAAGG ATTAAAAAGCATAATATCGTGGAGTCTCTTCTGCCTGGACGCTG TTCCTTCACCACCTGTCCCCAGCCGAGGCATGGCTGATCTCACC ATCCGTGGGAGAGTCCTCAAATGGGTCCAGGTGAAGTTGGAACC AGTGTGTTGGGCCCTGGAGGACAATGCAGGTCTCCTTACCAGCA GTTCAAAAGTTAGTGGTTGGAATAAAGAGACTGGAAGCAGTTAG GAAACGGGAAATGATGGGTTTTGTTTTGTTTAATGTTCAAATGT CACTACGAGTGGTAAGATTTTAAGCAGCTTGACACTTAAACATT CAAATTCTACCATCAGAGCCCCCATCCTGGATACAGGTGGGAGT TAAGCTCCTACCCTACAGGCCTGATAGTGAGTAGAAGTGTAATG GGGTAAGGGACCCCAAGTGAACAATAAGTCTCCTCTTAGAACTT GGTTGGTCTCACCCTGTTTAGAACCACAGAGATCTCCATAAGTA AGCTGTCCTTGAAACCCCCTGGAAGAAGGGGTCCCAGCTTCTGG CCCAGCTCCCAGGGGCATCAGGCTGGCTGAGCCCCGAGGAAAGA GATCTCTGGGTGCAGATCTTAGGTGCTGAAGCTGGGTTGGCATT TACATCCTAGAACATAGGAAGAGGCTTTGGCCCATTTGTCCAGC TGAGTTACATGTCCTGCTGGCAAGG	
KCP_10446	TGGGGGTGCTAGGCGCCGAGGTGGGCTGTGCCACCTGCCTCCCT TAGTCCGGACTCTCCTCTCCACGAGGAGCCCGGACAGGTGCTTG TATCCAAAGGAGAGAGAAATCGGCGGGAGGGCTGGTGTGAACAC CCAGAGGAGGGAGCCGGAGTGGACGTCTGCCCCAGCGGCAACTG GACCCCTCTGGGGCACCAGGTGTCGGGACTCTCCTCCTGGGGAA ATCTCTGAGAGCCGAAGGAAGCGGCATGTTCACAGGTGGGGGTG ACCGGATTCTCTGGTGGAAGTGTGGTGAAGCTCTTCCCATTCCC ATGACAGCTGGCGTTTGAGCACTCAGTGA [C/G] GGTGCTGCCA CACTCCCACACTCCTCCTAGGCGGCTATGCCAGGTGCAGACCTG CGAGTCCCTTCATCAGGAAGAGTGCTCTGTCTGCACCCCCAAAA CCTCTGCAAGCCAAAAGGAATCAGCTGCTGCCAGGGGTAAAACT CCCAGGCCTCATGTCCTGGTGGCTCCGGGAGTCAGGAGGAGCAA CCGTGAAGGGCTGGCTGCGAGCTGAGCTTACATCAAGGATTAAA AAGCATAATATCGTGGAGTCTCTTCTGCCTGGACGCTGTTCCTT CACCACCTGTCCCCAGCCGAGGCATGGCTGATCTCACCATCCGT GGGAGAGTCCTCAAATGGGTCCAGGTGAAGTTGGAACCAGTGT	SEQ ID NO. 152
KCP_38589	TCAAACTTTTCATTTGCTCAAAGCCTACAGCAAACTCAGTCCAC ACACTTGGCTATACAAGAAAGGTTGCTTTCTTTGTTGTTCTATA ACTGACTTTAATTTCAACTTCAAGTCCCCATTCTTGCCAAGGGG TAGAAATGGAATCTTGGTCAACTTAGGTTCCCCTCCCTACTCTC TGGGGTTGCATTTCCAGGCCAGGCAGTTTCTGCTGGTGCTTTTG TTCCTTGGTCCTCAGTCTTCTTTCTGTGTTGACATCCATTGACA TGTCCTCGACTCCCCTCATCTCAGATCACAGGCCCATGCTGACT CCAGGAGTATTCTTGTATTCTCTTCATCTGAACCTCAACACTTT TTGAGACCACGCATGCATGTGCTCTCTCTTTCTCTCTCTCTCTA ACACTTCTGGAACACTCTTGGACATGAGGAGATATTGGTCTTTC	SEQ ID NO. 153

	TAGGATGGGGTCAACTGGCCCTGCCTCAGATCCATTGGCCTGTA CATATCTTGTAGCCATTGTGGTGCCATGGATCACAGGTCACGAT GCTGTGTGGCTGCCTCTGCTCTTAGACCTGCCCCCCATGCCACC AGAGGGAGTGTCTGCCTCCCCCTGCCCTGGACACTCAGCTGGAG GGGAGGGTCACAGTCCCTCACAGTCCCTTCTCCAGTGACAAGCA ACAAACTCCCAGTCTTCCTTTCTTTCTGATCCTCTCCTCCTCTT CCTCCTTCTCCTCTTCCTCCTCTCCCAGTCCAAGGAAGTTTTAT GCAAAGGCCAGAGGAGGGAATAATGAGGTGGAGGTCTCTCTGAC CAAGCATGTAGCCTTCCGGATCTGTTGTGCTTTCCAGGAGTCCT TCAAAGCTCTAAGCTTTTGGAATTCTGCAAGCTCAGGAAATTGA AAACCTTTTCTCTCACAACTGCAGGTCTTTGTCTGCAGTTGTAA AAGTCTGTTTAGAAACTCAGGAGACAAGCAGCATCTTCTTTGTT CCCTGCTTTCTGGAGGCAGTCAGCGTGGAACA[A/C]CCTGCCT GCAGTCTGACTCAGGGAAAGGGTCACTGAGTGTGTGTGTGTGTG TTGAGGGGTGGATAATAAGCAAGGAGAACACTCAGACAGAGAGC TCACAGAGGGGCACCCCAGCACCTCCCTCACCTCTATATTCCCC GCCTGGGCATAGTGGAGGGAGGGTTAATGCCAGCCAAGTTTAAC AGGCATTTCTGATTCGCGGCATTGTTGTTGCGCTATCCTGCAAT CCTACGCTGCGGGTACTGTTTTTATCCTGATCCTTCAGCTCTGG AAACTAATATAGAGAGCTGAGTAACTTGCTTGAGGCCATGATGC CAGGATCCACGGTGCCCCCAGGCTGAAGAGCCTTAACCACTGGG CTGTACCACCTCACAGGAGGGCAGGTGGCACAGTGCCTGGAACT TGGGAGGGTCCAGCACGTGGAACTATGCTCTGTCATTTACTTAC TGTGTGTCACTGGATCAGTCACTCAACACCGCTAAGCCTCATTT TCCACCTCTTCAAAAGGGATCTAATAAACCTGTTAGCAGAAGGC TGCTGTGAACACTAAATGAGGTGGCTTAGGTGAGAGCTCTGGTC TGAAGATGCTCACACTTTGAATCTCAAGACTTGTGTGAACCAAT ATCAGATTTCTCCTATTAGATTGCAATTCTCAGGGAGTCACATT CCGTCTCCAAATGCCCATCTCCTGATCCACAAAATGAGCACAAC ATCTCTGATAAACGGTAACTAGATGGTTCCAGTGGGCAGCGGGA GTGGGAGGGCGGTTGACTGGGCCAGAACCTCAAATGTATTCCTG TGTAGTTTCTCATGCATTCATTCAGTTTGGCACCAGAAGGTGCC CAGACTCACTTTGCAGCCAGTCTGTCCCCATAGAGGTGATAAAG GAAAAACATATGCACATTTAAACTTTTAAAAGTTTATTTGAACA TTCAGCGATTCACAAACGGTATAGCACAGACAGCAAGCAACTAG CACTCCTCTAGGAGGGGCCAAACAG	
KCP_65199	ACAGAAATCCTTAAGAGCATCAGCCGTGACACAGAAATCTAATA CAATAAAACAAAGTGCTTATAAACCCCAGAGTTGTTTAAAACCC AGAAATTGCCAATTGACATATGGGACTATATCTTCTTAGCCCCT AGTAAACTGAGTGGCTTCAAACAAGTCCCTATCACCTCCCAGGG CCTCAGTTTCTTCACCTGTGAAATAAGAGGATCAAAAAAAGATA ATGTTCTCTCTGTTCTCTTCCAACCGAGGCAGGCATCTCAAGTA TTTCTTAGTCAGTTCTACTCTAGGCTACACAGTATCTGTATCTG GCAGCTGTATGAACTACTGTTGAAAATCCTCTTCCCAATCCCAG TTTCAACATCACTCCTCAAGGCAGCATCCACCTTCACTCTAGAC TGAATTAATTCCTCTGTCTTACCACCTAAACTCCTCTAGAAAAC TTGATAGAGGTAAAGATAAATGCATTTTTTCAAAAATTCTACTT TTCTAGTCCCAAGGCATTGTGTATATCATTCTTATGTAAGTTAT CACAATAAACCCATAATTAGTTACTTCCATTTATGTCAAATCGC CTACAAAGCAGAAACATGTATTATTCATTTTTGGCTTCCTCCCC AGTATCTAGCATACGAACTGTTTGCAAACATGCCCAGTTCTTCA AACTTTGTAACTTCATGCCTTTTCTATCTACTACTTGGGATGGG CCCACCCTCCCTTTGTCCTCTAAGCACACTCCTATTCATCCTTC AAAGTCCAGCACAAAAATCCCCTCCTCTGTTAAACTTCAACTGC TCCAGGCTGAGTCTTATGTTTGGGTCCTTCATACGTACCCCTCT TCTATTGTTTGGGGTATTGTGTGCTGTGGGATCTGTTTACTCTC AGTTCTCCCCTCTAGGCTGGGTTCCTTGAAAAACACCCTCTGGA	SEQ ID NO. 154

	CATTTCACCTCTACATCCTCTGCATTCTTGGCCAGGCTCTGAGA GGGCATTGGTAAATGTTAACTGCCTGGCAATG [A/G] TGATGCT GTTAACCTGATGTGTCAGGGGTCTGAATAAAGCTGCCTCAAGGT AGGCAGATGCCCACAACCAAGCAAGAACTCAAAGCTGCAGGCTC CTCAGCCTGAACCTTAGACAGCGTCTTGGTCACCATTTCAACAC CTTGACCACATTTCTCACTCTCCCAAATTTCCTCCTGCTTATTC CTCATCCACATACATAAGGCTGTGTCTCCCAGGGGAAATTCAAC TACTTGGTAATTATCCTGCTTCTTAAGTTTGGGGCTAGGGGATT CATAGATGATGTTCAGTATTATGCTGTGCAATGTAGATGCTTCC TAAACCTTCTCAGGAGCTACCACTGAGTGGCACCTGGGGACCTC TCAGGAAGAGCCAGTTTTCTGGGCAGTGTGGGGCAGGACAGAGC TCATTAAACCAGCCTACCACCTGTCTTCCAGCTCCTCCTCTCAG CCTCTGGGCTTCCAGCAGAAAGCACACGAGAGCATTCTTGTTGG TTTTCTTATGACTTGAGCCAGCGAGACGTACATGCCCAGCACCT GTTACCTGGGCTGGCTCTTGGCTGAGAGCATACATGCATTGGGT CAGGTTTCAGATCTGCTGGAGGAACACAGCCAGAATGTCTTGAC AGGCAGCCCTGGCAAAGCCCCAGAAAATATAAGATCTGAGTCTT ATGATGGACTCTGTGACCTTGAGCCTCTCACCTCGTGACCTTGG GCATCTCATGTTCTCTCCACAGGTCTCGGTTCTGGACTCCTTCA TGGGAGCTGTCATGCCCCTGTCACACAGCAGTGTTGTGCCCCCG GGGATCAGGGACCAGGATGGTCCTTTCTTGGTGGTGAAGGGGGC ATTTTGCATATTCCAGAGATTCAAGTTTCCAGACCTATCTAGAA AGAAACATTTGAGTTTACAGGTTGGCGCTTCTCAGCCTCTGTCT CTCTTCCTCTCTGTTCATCTCCCTCTGTCCCCTCTATGTATGTT TGTGTCTCTTTCTGTCTCCTCTGCC	
KCP_82468	CTCACTGCCTGCAGTTTATTCAGGCATTGGATGAGACAGCTTCT TCCTGCTCCATGTGGAGTCAGCTGGGTACTTGAACTGGGACATG GATGATCTACTTTCAAGATGGCTTATTCTCAGGGCTGCCAAATG GATACCGGCTATCAGTTGAAAGCTATAAGCAGGGGCACTCTGCA TAAGCATGGCTCATCTCTACAAAAGCTCCTCCCCAGTCTCCTTG TTTGGGCCTCACAGTGTATGGTAACCTCAGGGCAGTCAGAATGT GACAACTAAAGACTTCAGGAGTAAGTATTCCAGGAAGCAAGATA TAAGCTATGTGGCCTTCTAAGACCTAGCCTCAGAGGTCACATAG TGTAACCTCTATCACACCCTATTGGTAGATATTGTAACAGAAGC CCACCCAGTTTCACAGATGGGGACATAGACTCCATTTCTTAATA GGTAACTGGCCAGAGTTGTAAAAGAGCATGTGGGATGGAAGATA TTGTTGCAAGCATCTTTAGCAAATACAACTGGACATACCCAATG CAAGCACAGGATTGATCCTCCACTCTGCCCCCATACCCCATGAT TTATTAGCCACTCGGACAAGTGACTTCAACTCTCCAAGCCTCTG TCTCCTCCACTAAAGTGGGGACAAATGAGTATTACAAATGAGAC CATTAAATAAGATAATACATTTTAAAAATTAACCTGGTACCTGT CACAAAGTACATGCCTAACAAATGTTTGCTTCTGTCTCACTTCC TCAATTTCATCTCAGTCAACCTGGACTGACTCAAAATGGCATTC TTCTTGGCTGCCCCCTTTGAAGTATTTCTGCTGAGAAAATAGTT TCTGTGTATTTGTAAATTTACAGGTTGAACATAGATCATTATTC AAGCATTGCTGGTCGATTCGTCTTTTCAAAGGCGGGAGCTGCTG GCTGTGGGAAGGGACCCAGCAGGGGTCTCTTGCAACCCTGCTCT ATGGGTGGGGGAAATCTGGACCTCCCTCTGGT [A/G] GGGTTGA TTGAAGTGAAGGGTCACCATATGTCTTTCCCAAGAGGGTGACTG ACTTCCTGCTTTGGTCCCAGTTTCCCTGAGATTTTCCTGAAAGC CCTTCCGGCTAGCCCAGTTGGGAGTGTTAGTACATCAGATCCCA TGCTTTGGTGAAAAATGTAAACACAGACCTGATTTTTCATTTTA AATGAAGCCAAGCATATTGCTCCCAGCAGATGCCGAGTGACTCA ATCTGTCCTCTCGGTTCTGAAGGGAACTGAAGAACAACATGGTA AAATAAAGCAAACAGCACATTTATTGGTTGATAAAATGCTGTTT TAGTCTACCCTGGCATTATATGGTGATTGCTATGTGGCGAACAT CTGTTATTAAATCCAGACTTCTGTTGCCTGGATACATTGAGTCA	SEQ ID NO. 155

	AAAGCTGGAGCGGATGAGAAATCCATTTATGCGTCTGTTGCGTG TGAATGTCAGAGCTCATATGATGCCTTTGTCTTCATTCTAACTG AATCTTTTAATATGGACCGTCTCACTTGTTAATTCTGACTCAGG GGCAATAATGTTTTCATTTGATTAAAAAAGGTTAAAGAAACAAA GAAACAGTGTTTTCTCAGGTGCTCTAAGTAATTCTGTTAATGAA TTTTCGGAGACAGCGTGTGAATTTGAAAAGAGTAGGACTTTTTA AAGAGTTCATACTATGAACCCAATAATTCAGATCCTAGGGCCTT ATCCTAAGGACATAATAGAAATGAGCACATTTATAAGAACAAAG ATGTTCAATGAAGTGTTACTTACAACAGCAAAAAAACTTGAAAG TCACCTAAATGTTTGTAAGTCAAGAGCTTCATTGATATTGACTG CAAAGTCCATGTTATTCCATGTGACGAATTTTTTAATCAATCAC CTCTTGATGGATTTTAAATTTTTTACAATTTTTTGCTATCCTAA AAAAAATGTGTCAATGAACAACTTTGAACTACCCTGACTACCAC TTTAGGATAGATTGCTAGACGTGGA	
KCP_8579 3	ATCACCCCAAATAGTTATGATGAAGGTGATCTATGTACGACACT TAGAGAATCAGTGATGGAAAATTCACCAAGAACAGCCACAGGCA GGCCAGAAGAATGGCCCTGCCCCTCTACTTTTAGGATTAAGCAG AAGCTGGCCCTAGATCTCACCAGTTACCAGTGATCTTGGGCATT TTTAGCATCATGTGCATTGCTTCACTGTGATACCATCTTGCTGG CACAGCCATGGAAAGCCATGAGTTAATGCATCTCCCCATGTAAC AAACCTCCCCTAGGACTCTGGTCCACACCTATCTCTGCTAGATT CTCTGGCATTGCAAGAAATTCTTCAGACTGCCCCAAGAGATTCG TTCCAATCTAGGGGCTCCTTATCCCCAGCTCAGAGCTGGATTTG GCTCTTGCTTGGAGGCGGGAAGCCCTGCTGGGCCAGGGCTTAGA GGGGCTCACAAGAAATCAAAGCAAGCATTCTCCGCCTCTCTCCT ACAGCCCTGCATGCATCTTCTCTGATCCCTTGCCTGAGTGGGGG GTGGCATTCCAAAAGCTCATTACTGGCTTACATACTTTGCCTTA AATCAGCTCTTAAATGCCCTGGATGAACAGCCCTAAATAGGAA AGAAAAAAAAAAAACAAGTTTCTTGCAAGTTCACAGATATGCTT GGTGCTTTCTGTCAGGCTAGGGTGTAGCCTTCTCTGTTCTAAAT TTGATTTTCTGAGTCTTTAAGGAAAAATGGCTACTGGTCCCCTG GACGCTGATTGCTTCAGCATCTGAATCTGCTCCATCACTTCTAC CTCCACCCACTGGTCCACGTCCAGTGGGTAGAGGTAAAGGGGAT GGAGATATCATTTATCTTCAAAGGATAAAACTGCTCTGAGAGAT CTTTGCTTTCTTAGAAACACTGCTGGAAAGTTGTTTCTTTAGAC TACATTAACAGAAGTACCATCTCTAGGAAGACAAGGTGGTAATA ACTAACATCAAATGAGCAGTTCCTATGTACCC [C/T] GTACATG TCTTAGCCAACTTCATCCTTGTAACAAACCTGGAAGGCAGGCAC TGTTATCACTCTTATTCCCAGGTGAACCAGTTGAGGTTCCAAGA AGTCTTTTGTGCAAGGTCATGCAGAGTTGAGGCCCCCAAGTCGG TAGACTTCAGGAGCCAGACCCTCAACCCCCTCACTGCCTCCCGC CTCATGCTGCACTGAGCAGACCATACCCGGATGGTCATGTTCAG GTTGGCTATCAATGCAGACCACGCTGGGCATATTCAGGGGACGG ATACTCAGAACTATATAACATAAGGAATAGAGGAAGGACTGGAG GATGTATTAACATGAAGAAAAGGTAGACTCATGGCAGGAGATGA GCAGGGTAAAGAGGTGCAAGACATAAAAAGCCAATTTCATATAC ATGAAGATTTATCAAGAGCCAGAAGGCCCTCTATGGGTCCAAGA GTTACAAGGCCTAATGAGGTGAATTAATGCCAGCATATAAGGAA AAGCTTTTGAATACTCAGAAGTGTCCAAAAAGGGGTCAGGCTGC CTTGGAAAGTAGTAAGCTCTCCATCAGAGGCTTGGCAACTTCTT ATTAGGGATGGTATGAGTATCTCAAGTACAGATACAGATGACCC AAATAACCACTGAGGCACTTCTGACCCCAAGTATAAGAGATTCT ATTGTAACGCACAGGAGTCCATCTCAAGCAGCACACTGAGCCAT CTCCTTGATAAACCTAAAGGTAGGTATTATTCCTCCCAGATGCT GTCTTCTTAGCCTGGGATGCAAAAGCCATAGGATCACTTCACGT CCAACCCCCATCAGGTGATCTGTCATGAATCACAAGTTATTGGA GCCAGATGGAACTACAGAGCTAAAAGATACATGAAGACACCGAG	SEQ ID NO. 156

	GCCTGCAGACAGGGACTAACTTTCCAAGGTCACAGAGCTAACAAGTGTCAGAGTCAGGCTAGACCCAGGACTCACAAGTTGAGCTCACAATTAGTTCCACTTCCTACACCACC	
KCP_93545	CCTGAGCCTCTGCCTCCTTCTGAGAAAGACCCTTGTGATTACATCAGGTTCACCTGGATAATTCAGGATAATCTCTTCATCTCAAAATCCTTAAGTTGATCACATCTGCAAAATCTCTCTTACCATGTAAGGTAACATATTCACAGCTTCTGGGGATTAGGACATGCATCCCTAGGGAACCATGATTCAACCTAGCATGGGGGAACCCACTACAGGCAGGTGTTGTCCTTGCCATCGCCAGCTCAGTGCTTGGCACAGTAGAGGCCATGGATATTCATTCAGAGAGAGCATGCACTGAGGCAAGCCTGACCTCAAGATCAAGACAGGAAATTGGCTTTCATGGGTTAAGGACCTGTTACTTTGCTCATCAATGTATCCTTAATCATCAGAGGTCAGATCTGCTGGAGAGTGCAATCTTTCAG[G/T]TTCCAAAAGTAAGACTGGATGCCTTAGAACTTAAAGTCAGGGAGGTACCCAAGAAAGCAATCATAGACTGAGTCCCCATGCAGTGCACTTTCTCGGATGGACAATTTCTCTGTTCTGACAGTCACTGTTGACTCCATTTCTCAGATGAGGGACCGAGGCACAGAGAGGTGCAGTCAGTCACCTGAGGCCACACAGTCAGGAAGTGGAAATCCATGGAAACTCATCATCAGCTGCCTCGCATCAGGGCCAGTGCTCTTTATCTCCACCCCACACATTATAAAGCCACTCAGCTTTACACTCAAGGGAACTTCCTATTTCCCTACTGGATTATATGTATAATTTGTAGTATTGCAAGATTTGAACAGAAGCGAGCAGCAGCTTGTAGTTGTGTGTGTCACTCACTCCTGCCTGTGGGGATGCCACGTGATTGTTTAAAGGGTTGGAATCAGGAGAAAGGCAGGCTCAGAGCAGGACCAAGAGAGAGCCCACCCCTCGCCTCCC	SEQ ID NO. 157
KCP_97844	ATTATAAGTATATACCACACTTTGTTTATCCATTCACTTGTCGATGGAAATTTGGGTTGCATCCACCTTTTTTTGCTATTGTGCATAATGCTGCTATACACATGGCTGTGCAAATATCTAATATTAGTCCCTGCTTTCAGTTCTTTTGGATATGTATCCAGAAGCAGAATTCTTGGATCATATGGTAATCCTATTTTTAATTCTTTTAGGAACTGCCATATTGTTTTCCACAGCAGCTGCAGCATTTTACATTCCTACCAGCAGTGCACAAGAGTTCCAATTTCTCCATATCCTCACCAACACTTGTTATTTTCTGTTGCTGCTGTTTGTTTTTTTATTAATAGTCATCCTAATGGGTGTGAAGTTGTTTCTCATTGTGGTTTGCTTTGCAGGTTTTGATTTGTAGATTTTCCTGATGATTAGTGATGGGTGCATCTTTTCATGTTCTTACTGACCTTTTATATATCTTTCTTGGAGAAATGTCTGTTAACTCTACTCATACTTTTGTAAATAGTATTCCCAATCCTTCTAACTCCCCAATGAGGTGGATATTAGTATGTTCGTGTTACAGTAAAGCCAACTAAACCTTAGAAAGACTAGGTT[A/T]ATTATCCAAGGTCACACAGCTAGAAAATGACACAGCTTGTATTGAAACATCAGTTTTTCTCTTTCCAAACCTAACGCACATTTCATGAAACCTACATTATTGCACCATAACATCATGTTGATTTACTTATCTGCTCTCCTGCCTGTCCCATCTACTACATAAATTGAGTGTGGTTTGAAATCAGAGACTACTTCTCATCTTTGGCACAGTGGCAGCCATGGATCAGAATCTCTTACATGCTGGATAAGTGGATGCAAGCTCAAGGCCACACCTAAAGTCCCCAGGTGACTTGATCACTTGAGTTAGCTGCTGGAAACCTGGGCTTCCTCTTCTGCAAAATGGGGAGAGAAAATAAATTCTCAGTGGATTGTTTAGAAGATTTGAGCAAAGACCTCTGCAAAGTGCTAAGCATGTGGCTAGCATGTGGCAGGTGCTGCCTAAATAGTAGAAATTAACACTGCCATGCTTATAAGCTCCGGACAAACACAAGAAGCCCGAAACATAATCTGTGCCTTCTGCTTGCATTCCTCCTAGTTGGGGATGTAAAATAGCCCAGCTACAATCAAAGAAGAAAATCAAAGTCAGCACAGACTATGGATATGCTTCTATATGTGTAGATTATTTCCAGACTCATTCGGAAGAATCTGGACATACTGGTTGCCTCAGAGGTCAAGAAAATTGGCTCATTTACTTCTGTAACTTAATTTCGACTCTCTATGCTTTTACATAGTTGGAATTTGCCATGCACATATACTACATTTAAAAGAGCGTGTACGCG	SEQ ID NO. 158

KCP_102882	CACAATTATGCTGTAGGTGAGTTTTACCTTGGGAAACCAAGGCA CAGAATTTAAGTAACATATTGAAGCTCATGCAGCTGCTAACAGG GAAGGCCAGGGTCTGAACCCAGCTGATCCGGCTCCAGCATCCGA GCTCTGAACCACTGGTCTATCCTGCCTCTGTTAGGACTTGGTCC AATGTCATCATCCTAGAAGGAACATTTAGGCCCGCACGGTGGGT GGCTGGTTCAATCCAGTTTAAAGGCCAGGAGCAGGACAGTGACT TGCAGCTGCAGCAATCCTATGACTCAAACCAAAGCAGCTGTGAC AAATAAAGGGACTGACTCTCATTCTCCCGTGCTAGGGAAGGATG AGCTATCAGGCCTTGTTGCAGGCTGAGTCAGTCATCCCACAAAC CACCTAAGTGAAACCTCTTCACTGAGCCTTATTTCCTGAGCGCT CTCCCTTTATCTGTGCTTGCAAAGAGG[C/T]GTCTCCCTCCAT GCCAGCCAACCCACCCACCCCCGCACACACATACCACCTCTGGC TGGAACTGACGACCATGGGTTTAGAAATGAGATAAATCTGGGA GATGAATGTATTCATGAGCCCATAAAGGGGTCATGAATCACTGG CCCCAATTACTGCCTTCAATCCTGACAGGATGAATTCCCTCAAG CAGATTCTCCTTGTCAGACAACACGGGAGGCAGTGTCATGGCTG ATCTAGAGCCACAGATAACATCATTATTCCATACCAGGCTGGTT TCGGTTTCCCAAGCCACCTCCACTTGATTTACAGCTCACTTCTG ATGCTGGAGAGAGAGATAAATATATATATATATATATATATATA TATATATATATATATATATATGAAAGAAAGAAAGAAAAGAGAGA GAGAGAAAGACACAAAGGGGAAGCTTTCATGCC	SEQ ID NO. 159
KCP_107380	ATCCCAATAGGACACATGTTGTATTAAAAAGCCATGCGAGACGG AAGAAGGAAATTGAATGAAATTTGAGGGCAGGTAGGAGCAGAGA CAATAAATAATTCAGCAGTGAAGGAAGCAGAAAAAAGATTGCAC TCATTTCGCCCTTCAACAATTATACTAAACACCTGCTCTGGGCC ACAGAAGGGCCAGATCCCATTCCTGTGCTCAGGAAGCCCACAGG CCGGCAGGGAGAGGCTGGTTGGAATGTGTGCTTTGCACTGTAAC GGAGGCATCGAGCATGGTAAGGGACTGGCGGTGGCTGCTGCCTG CGGACGTCGAGCAGGGGCCTTTGAAGAGGCAGGACCTGTCTGGA GTCTTACCTGGGCCTTGGCCCTGGCAATGGGGAATGGAGCAGGC AGCAGGGGACAGATGCTGCCAGA[A/G]ACCGAGATGGTGCCGG AGGACTGGGCTGAGTCTGGGTCAAATGACACCGCCCCAGGCTCT CTGCCCTCTGGGGTGAGGCAGGAGGCTGCCTCTGTGTGTGATTC AGAGACCCTAGAATCCCAGTGGCCATCACCCCACAGCACATGCC AACCTTTCTGTGATAACTTTCTCTTGTGGAACTGTGAAAGTGTA AGACCAGCTCCTGTATAGTGCATGGCCATCCTTTGCTTTGGGGA CAGTAAGTCAGTCAACACATACTTATAAATGGGGTCCTGGGCCG TGGCACTGATCTGGTCCTCCCACCTTGCCTCACACTGCCCTTCC CACTCACCACTTCCCTCCTCTGCATCTTAGCCGCAAGGGACTTT CAGACCAAGCAGACCTGGAATCAAATCCCACCGCTGGGCCTCAA TGCCAGTGGAGACAGGAACAGCTGATCCCTGGAGCCCTCAGGAG GAAGAGGACGGGATGCCTGGC	SEQ ID NO. 160
KCP_108703	CCCACTCACCACTTCCCTCCTCTGCATCTTAGCCGCAAGGGACT TTCAGACCAAGCAGACCTGGAATCAAATCCCACCGCTGGGCCTC AATGCCAGTGGAGACAGGAACAGCTGATCCCTGGAGCCCTCAGG AGGAAGAGGACGGGATGCCTGGCTTGGCTGCTGGTCTGGGGCAG GTGCCCAGTTACAGCAGTTGGAAAAATCCTCAGTGTTGGAAGGA AATTTGGAAGTGAGCATCTACCTGCCTGCCGTGCAGTTTGTGAC TTTTAAGATGGTTGACAGAACATTCCCAAAGGACCACAGCGGTG ACCACTGTTCTCGTTTCCCTTTGGTGGCTCACTCACTCAGTGCT GGACACAGTGGTCCTGACAAGACAGTGCTGTGGCTTCCATGAAC CTAGGACAGGGATAGACTCAAGGACTAAGAACAAACCAGGAAGA AGCATCACCACAGGCTCCTTGCCAGTCACCTCATCTCACCCCTCC TGGCCCTGGCGGATGGGTCTCCATATTTACAGGGGCCAGATGAA AAAACCAGAGGAGCCAGGAAAAGGAGCTTCCCCTTCCCAAGGGC GCAAGGTGAGGTGCCAGTCATGAGATGCAAGCCCTGAGCTTTCT GATTCCACTGCATGTGGTCCCAAGGTTCGGCGCCGCATCACACA	SEQ ID NO. 161

	GTTAGTGAGCACACTCTCCTCCCCTGGCCCCGAGTGAGCCAGCT GGATGGCAGATCAGAAAGAGAAGTCCCGGGTGCCCCCAACATGG CTAGCTCCTTCCAGGACCAGGGGCTAGGCCCCAGCTAAGGCTGG TGCACACAGCAGGGCAGGGGGCGAAGGAGTGGGATCCCACCCAG GGATCCCACCCACCCCAAACCTGCTTTCGGACATCTTTCCAATG CATAATGTGCAGATGAGGCCCTTTGATAAGGACCAAATCCCTTT CCGTTGCTTGGCAACCTGGCTCACAAGTCATAGCAGGGAAGTAA TTTACAGGAATTCAAAGTGTCGCTGGAGGTTC [G/T] GCTGAGC TGAATTGCTGCAAAGAGGAACCTCAATGGTCCAAATCACACCTC TGGCGGGGAGGAGGGGCTGAAGGAAAAGCTTCCACTTCCGTCAC TTGAGAGTACAGAGCCCTGAGCTCAGACTCAGCGATCGTTTTCC ATTAACGGATTTACTGGTTCCATGTTGAGCTCCTGCTGTGTGGC AGGCCCTGTGCTGGGAGCCAGGGACACAGTGACAAACGAGACAG ATGCCAACCCCGGATGCACAGAGCTCAAAGAGACAGAGGAGTAA ACAGGGCTACACATGTGACAAGATAGGCTGTGCACAGGGGTCTG AGCAGGACCCTTGGGGCAGGAGGAGGCAGTGGAGGGATGGGAGG GTAGGGACGCAGTGGTGACCAGCTAGCCAGATAGAGAACAGAGG GTGTCCCAGCACAGGGCCACACAAGCAAAGGCAGAGGTGGGGAG AGAAGAGCCTGCCACACTCTCAGATCACCATGTGGTTGGGCCAG GGCCCCAGCTGAGGCTGAGGACACATGGAGCCCAGATCCGGCAG GGCCTTGAATGCCAAGTCAGAAAGCATCTGAAATTTAGTCTACA GATGATGTGGGTTATTGACAGCCAGGACAGGGAATGACATTTGT GTTTCAGGAAAACCACTGTCTTCACTGTTAGGGGGTAGATTCAG GGAGAAACAGGAGGTGGAGGGGAAGAAACTGTGAGTAAAGGAGT CTCTGGGGTACAGGTGAAGTTTCTGTGAAACTGGAGAAGAAAAC TGTTGAGGCAAGAGTTGACAAAACTTGAAGTAGGATGGAGAGGA AGGGACAAGTTCCCCTGGCATGGTGACGGCCCGGTGGTGGGAAC CAGGGAAGAGGAGGGGCTTTGCAGGTGTCTGACTTGCCCAACAG GTGGCGCCATTTACCAAGATGGGAAGGGCCGGGGAGAAGGGAGG GTTCCATTCTAGGGAAATCTCAGGTCCTCGCTATTAGGATTCTT TCGGTTGCCAGTGACTGAAACCCAG	
KCP_1248 77	ACTGTCTAGATCTGGGGACCCTCCCAAGCTCTCAGAGCTTTGGA AGGAAGGTCCCTGCAGGGAAACTGTGTGTGTTTCTTCAACAGTG TATCCTCAGTGCCTAGCACATGGTAAGTGTTCCATAAACAGCTG TTGAAGAGACGGATGGATAACTGAATGAATGGATGCTTCCATGG GCAATGACACACTAATCTGAAAAGCCCTGTATCAATGAAAGAAT CACTTAATAGTTTAACTTTTCCCTCATCCTTCAGAACACAGATG GCATGCCATCTTCCCTTCAAATCTCTTCCCAGTGCCCCACACAG AAGAGGCACACTTGGACACTGGTGTCTGATGGACCCAAGTTCAC AGCCTGTCTCTGGTCATCAGGTATCATGACCTTGGGCAAGAAGC TTAACTCTCTGAGCCTCAGTTTCCCCTTCTGTCCCCCAGGGAAA ATGAGTCCTGCCCCTCCTAAGGGAGGTATGAGATGTAAGACCCC GAAGGACACAAAGGTT [C/T] GCCAGGAGCCTTCAGGTAGGAGG CAGGTAAGGAGGTCTGCTAGATTGGAATGAGTTTCTGGAAGGCC CCAAGGAGCTCAAAATCAGACCTGGGGTGAAGGTGTCTTGACCA AAATGAGACCCATCAAAGAAGCCTGGATGAAGGTGCCCACAGCA TCCATCAGTGCCAAAAACAGAAACACTTTAGCCCAGGATACAAG GAACATTTTAAAGCAACAGAGATAAGAGATAGTTAGAACTCAGG CCTCCTGGCTCTTGCTGTTCTTGGCCCATAATTAGTTGTTATGG GACCTTAATAAACTTCTTGCCTTCTTGGTACCTTTGCCAAACAA TCTGATGAGGAGAATATTGAGTCATGGTGCCAGGGAAAATTAGC ATATTCTGCAAATTCCTGGCACTGTTAACACTGGATTCTGTCCA CCTTTAGAAATCCTCAGATCACTATGTCAGCATCCCCCAATCAC AGCTCTCCAACTTCAAGGAGGGTTGAGGGGTCTGAAG	SEQ ID NO. 162
KCP_1260 86	AAGAATATCAGTTCCACTTCCCTTGTCCCTAGAGAGCCTTGTAG TGGATGTTGATGTGTCTTCCAACACATGCACCAACCTTTCCCTG TCCTGTAGCAGTTGAGATGGAATCATCCCACTCCCAGCTCCAGG	SEQ ID NO. 163

	AATAGGCTCTGATGGGCTTGAACCCAGCAGCTTAATTCCATTGG TTCTCTAGGCCTTCATCATTAGTACAGGAAAGGCACTTGACCTA AATTAGTTCGATAAGATTTAAGCTCAGAAATCTGGTTTGTTGGA TGGAGAAAGAGATGCTTTCTTTCTCTCTGGAAGGAGTTTATTGC AAAAGTAAGGGCTGGGGCTGCTACAGCCATTGTGCTACCATGAG GGAACTAGCCATGATAACAAAACTTGCCTGGGGAGGGGCTACGC ATCACAGAAAATGATGCCAAAGTCCTGCTCAAACTGTGCCTGAT GCCTGCCTGATCTATGGACTTCTTAGTTCCATGTAATGGATTCT CTCTATTTTTAAAGCC [A/G] TATCAGGTTGAATTTTTGGAGAA ATAAAACAAAAAGCATCTTGACTAATTTAAAAAATCTTCTTTGG GTATTCAACCCTCCTAAACTCACCCCCAAATCCACTGGGAGCAT GTCAAGATTTTTGTGAGCCGATTTAGGAGATGCAAATTCATTTG CCTTAATTGGATCTCCAGGAAATGACTTCTGCCCCCTCTTAAAT CATTTAAAGCTCAAAGAGGCATGAGGGCCCTCCCCAAGGATGCA GGTATCCTCTTGACTGACAGCCTGTATGCTCTGCTTCCAGGATC CTTCCATCTCCTCCCTTTACTGAGGGAGTCTGCTATGTGTTAGA GGTGTCCATCACTGGTCACACTGGGAAGCTGTGGCAGGGAAGCT GGAGAAAAAGCAAGATAGGCCCCAGAAAGAACACCAACTCCAGA CTCAGGGAGACTCAGGCCAGAATCCTAGCTCAACTTCTTCCAAG CTCCCAAAGTCACACTCTTTTCTCTGAGCCTCGATTT	
KCP_126208	ATCCCACTCCCAGCTCCAGGAATAGGCTCTGATGGGCTTGAACC CAGCAGCTTAATTCCATTGGTTCTCTAGGCCTTCATCATTAGTA CAGGAAAGGCACTTGACCTAAATTAGTTCGATAAGATTTAAGCT CAGAAATCTGGTTTGTTGGATGGAGAAAGAGATGCTTTCTTTCT CTCTGGAAGGAGTTTATTGCAAAAGTAAGGGCTGGGGCTGCTAC AGCCATTGTGCTACCATGAGGGAACTAGCCATGATAACAAAACT TGCCTGGGGAGGGGCTACGCATCACAGAAAATGATGCCAAAGTC CTGCTCAAACTGTGCCTGATGCCTGCCTGATCTATGGACTTCTT AGTTCCATGTAATGGATTCTCTCTATTTTTAAAGCCGTATCAGG TTGAATTTTTGGAGAAATAAAACAAAAAGCATCTTGACTAATTT AAAAAATCTTCTTTGGGTATTCAACCCTCCTAAACTCACCCCCA AATCCACTGGGAGCATGTCAAGATTT [T/C] TGTGAGCCGATTT AGGAGATGCAAATTCATTTGCCTTAATTGGATCTCCAGGAAATG ACTTCTGCCCCCTCTTAAATCATTTAAAGCTCAAAGAGGCATGA GGGCCCTCCCCAAGGATGCAGGTATCCTCTTGACTGACAGCCTG TATGCTCTGCTTCCAGGATCCTTCCATCTCCTCCCTTTACTGAG GGAGTCTGCTATGTGTTAGAGGTGTCCATCACTGGTCACACTGG GAAGCTGTGGCAGGGAAGCTGGAGAAAAAGCAAGATAGGCCCCA GAAAGAACACCAACTCCAGACTCAGGGAGACTCAGGCCAGAATC CTAGCTCAACTTCTTCCAAGCTCCCAAAGTCACACTCTTTTCTC TGAGCCTCGATTTTCCCATCTGCAAAATGGGGATACTAAGGGTC ACCTAGCTGGGCTGCCCTGGAGATTCCAAGACATTA	SEQ ID NO. 164
KCP_129093	GGGTCCTAACAGGCCACAGACCCATCCGTGGCCCAGGGGATTGG CGACCCCTGTCTTTTTTTTTTTCTTTTTTTTGAGATGGAGTTTC GCTCTTGTTGCCCAGGCTGGAGTGCAATGGCACGATCTCGACTC TTCAACCTCCGCCTCCTGGGTTCAAGCCATTCTCCTCCCTCAGC CTCCCAAGTAGCTGGGATTACAGGCACCCGCCACCATACCTGGC TAATTTTTGTATTTTTAGTAGAGATGGGGTTTCTCCATGTTGGT CAGGCTGGTCTTGAACTCCCGACCTCAAGTGATCCGCCCACCTC AGCCTCCCAAAGTGCTGGGATTACAGGCGTGAGCCACCACGACC TGCCCGGGGACCCCTGTCTTAAACCACCCCAGCCTGTGATACTT TGTTATGGTGACCCTAAGAGGCAAATACACCCTCCTTTCCCCAA CCTCTCCCCTCAGACGAAACCGATGCGAAAAGTGCTTCATGAAG TTTCAGGTAAAGAAGT [C/G] TGGACGAAAAGGATAGTGAGG ATGGCGGGAGGGGCTGAACTCCAAATGGGCTTATCAAGGCTCTG CAAAATGGCGTGACGGCGCTGCCCCCTTCTGGTGGCCTGAAGAC TAACGCACATGATGTCAAGTGCGGGGCCCAAGTACTCAGGAAAA	SEQ ID NO. 165

	GGTTCTCATTTGGACACTGGGAGGTCTTACATTGGGGGCCCTGA GCCTCCAGCCCTTCCAAATCTATTCTCAGCAGGAGCTCAGCCAC ACCTGTGTCCCAGAACTGAGGCCAGGCCCAGCCTTCACTCCACG CCCAGCCAGCCCCAAGGAACCGACTCCCTGAGGCTCTATGCTCC CTGCCTCCAGTGGCCCCGTGTCTGGGAAATAGTGGCCCTGGCCT GATGCCCTGACCTGGGCAATCCATCCCCTGGTCCTCTCAGCTCC CGGGCCCAGGTTTTCTGGGCTACTTTAACCAGGGCAAACTCATT CCTCGAGTACAAAATAAAAGATTCGAACAGCATAATC	
KCP_1291 27	GGTTAGTGGGATGCAGCGCGAGGCTAAGGAGTGTCTGGGGCCAC CAGAAGCCAGGGAAGCCTAGGAAGGGTTTTCCTAGAGCCTTTGG AGGGAGCACAGCCCTGCTGACACCCTGACTTCAGACTCCCAGCC TCCAGAGCTGGGAAGGGATAAGTAGCTGTTGCTTTAAACCAGTG GTCCCCAACCCTTTTGGCACCAGAAACCGGTTTTGGTTCAGTGG AAGACAATTTTTCCACGGACAGGGTGTGTGGGGTGGGAGATGGT TTCAGGATGAAACTGTTCCGCCTCTGATCATCAGGCATTAGCAT TAGTTAGATTCTCATAAGGAGTGAGCAACCTAGATCCTTCGCAT GCGCAGTTCGCAATAGGGTTCATGCTCCTATGAGAACCTAATGC GGCGGCTGATCTGACAGGAGCGGAGCTCAGGCGGTAATGCTTGC TCGCCAGCTCACCTGCTGTGCAGCCGGGGTCCTAACAGGCCACA GACCCATCCGTGGCCCAGGGGATTGGCGACCCCTGTCTTTTTTT TTTTCTTTTTTTTGAGATGGAGTTTCGCTCTTGTTGCCCAGGCT GGAGTGCAATGGCACGATCTCGACTCTTCAACCTCCGCCTCCTG GGTTCAAGCCATTCTCCTCCCTCAGCCTCCCAAGTAGCTGGGAT TACAGGCACCCGCCACCATACCTGGCTAATTTTTGTATTTTTAG TAGAGATGGGGTTTCTCCATGTTGGTCAGGCTGGTCTTGAACTC CCGACCTCAAGTGATCCGCCCACCTCAGCCTCCCAAAGTGCTGG GATTACAGGCGTGAGCCACCACGACCTGCCCGGGGACCCCTGTC TTAAACCACCCCAGCCTGTGATACTTTGTTATGGTGACCCTAAG AGGCAAATACACCCTCCTTTCCCCAACCTCTCCCCTCAGACGAA ACCGATGCGAAAAGTGCTTCATGAAGTTTCAGGTAAAGAAGTCT GGGACGAAAAGGGATAGTGAGGATGGCGGGAG [A/G] GGCTGAA CTCCAAATGGGCTTATCAAGGCTCTGCAAAATGGCGTGACGGCG CTGCCCCCTTCTGGTGGCCTGAAGACTAACGCACATGATGTCAA GTGCGGGGCCCAAGTACTCAGGAAAAGGTTCTCATTTGGACACT GGGAGGTCTTACATTGGGGGCCCTGAGCCTCCAGCCCTTCCAAA TCTATTCTCAGCAGGAGCTCAGCCACACCTGTGTCCCAGAACTG AGGCCAGGCCCAGCCTTCACTCCACGCCCAGCCAGCCCCAAGGA ACCGACTCCCTGAGGCTCTATGCTCCCTGCCTCCAGTGGCCCCG TGTCTGGGAAATAGTGGCCCTGGCCTGATGCCCTGACCTGGGCA ATCCATCCCCTGGTCCTCTCAGCTCCCGGGCCCAGGTTTTCTGG GCTACTTTAACCAGGGCAAACTCATTCCTCGAGTACAAAATAAA AGATTCGAACAGCATAATCAAATAGGTCATACCCATAAATCAAC ACATTTGAGCACCTATTTTGTTGTTCTTTCACTAATCCAAACCA TATTTATTGAGCATCTACTATGTGCCATTCTCCAGTAGCCATTC TAGGTGCAGGGGATACAGCAGAGACCTTGAAAAAAGGAACAGTC TCTGATCTTGCTGAGCTTAGAGTCAAGTGGAGGTGAGGAGGAAG GAAATGAATTAACAACTAAGTGAAGCAGAAGGTAACCAATTGAT TGACTGACGAAGGGGTACAAACAACAAACACCTTCCTTTCTCCA AACTCTATCTTTAACTGTATTCTCTCGTTTTCCTTCCTCTCCAT TTTACAATCATTTTACAACATCTCTGGCTATTCTCCTATATTTC TGATCACTTCGGTTCTCATCACAATAATAATTTCAGTTTTCAAG CATTGGAAAGTCCCATCCAATTAAAATGTCAATCTCACACGCAG TTTAAACGTTTCGCCTGCCCGTGAGCTCAGACCTGTCTTGGTGC CTCAGTTCTTGTGTGGAGGGGAGGA	SEQ ID NO. 166
KCP_1296 90	TGGTGGCCTGAAGACTAACGCACATGATGTCAAGTGCGGGGCCC AAGTACTCAGGAAAAGGTTCTCATTTGGACACTGGGAGGTCTTA CATTGGGGGCCCTGAGCCTCCAGCCCTTCCAAATCTATTCTCAG	SEQ ID NO. 167

	CAGGAGCTCAGCCACACCTGTGTCCCAGAACTGAGGCCAGGCCC AGCCTTCACTCCACGCCCAGCCAGCCCCAAGGAACCGACTCCCT GAGGCTCTATGCTCCCTGCCTCCAGTGGCCCCGTGTCTGGGAAA TAGTGGCCCTGGCCTGATGCCCTGACCTGGGCAATCCATCCCCT GGTCCTCTCAGCTCCCGGGCCCAGGTTTTCTGGGCTACTTTAAC CAGGGCAAACTCATTCCTCGAGTACAAAATAAAAGATTCGAACA GCATAATCAAATAGGTCATACCCATAAATCAACACATTTGAGCA CCTATTTTGTTGTTCTTTCACTAATCCAAACCATATTTATTGAG CATCTACTATGTGCCA [G/T] TCTCCAGTAGCCATTCTAGGTGC AGGGGATACAGCAGAGACCTTGAAAAAAGGAACAGTCTCTGATC TTGCTGAGCTTAGAGTCAAGTGGAGGTGAGGAGGAAGGAAATGA ATTAACAACTAAGTGAAGCAGAAGGTAACCAATTGATTGACTGA CGAAGGGGTACAAACAACAAACACCTTCCTTTCTCCAAACTCTA TCTTTAACTGTATTCTCTCGTTTTCCTTCCTCTCCATTTTACAA TCATTTTACAACATCTCTGGCTATTCTCCTATATTTCTGATCAC TTCGGTTCTCATCACAATAATAATTTCAGTTTTCAAGCATTGGA AAGTCCCATCCAATTAAAATGTCAATCTCACACGCAGTTTAAAC GTTTCGCCTGCCCGTGAGCTCAGACCTGTCTTGGTGCCTCAGTT CTTGTGTGGAGGGGAGGAGAGGAGAGGGGAGGGGAGGAGAGGAA AGGAGACCGGGGAGGTGGGGGGGGAGAGGGGAGGGGA	
KCP_1303 09	CTATCTTTAACTGTATTCTCTCGTTTTCCTTCCTCTCCATTTTA CAATCATTTTACAACATCTCTGGCTATTCTCCTATATTTCTGAT CACTTCGGTTCTCATCACAATAATAATTTCAGTTTTCAAGCATT GGAAAGTCCCATCCAATTAAAATGTCAATCTCACACGCAGTTTA AACGTTTCGCCTGCCCGTGAGCTCAGACCTGTCTTGGTGCCTCA GTTCTTGTGTGGAGGGGAGGAGAGGAGAGGGGAGGGGAGGAGAG GAAAGGAGACCGGGGAGGTGGGGGGGGAGAGGGGAGGGGAGGAG AGGGGAGGGGAGTGGGGGAGAAGGGGAGAAAAGCGCAGCTGGCT TCCTCACTCTCCTTTCCTTCCTCACCATCCTTACCCTGGCCCAG GGCAGGAGGAGGATTGGCAGAGTAGA [A/G] GCAGGGTCTTCTG TCTTAGCTGGGCCTGTTGGTGACTTTCTGTTGGCCAACATGGGC TGACTGGAATGTTCTCCAGCATGGCACATGGTCATCCAGATGCA GGCTCTTCCCTGGGGCACTATAGCAGAGAGGGCTCTCTTCCAGT CTATTGCAGATGGATGCCCTCGTGAGCTGAGTTTTGATGAACAT CCCATGTCCCCAGCCACCCCATTCAGAGCCTCTTTCTACTCTGG TCCTCTGGTCCCAGCAGCAGCCCTCTGGGTACTGAGGGGAGGGC ATCTCACCCAAGCCCCTTAAACCTGCTCACCTTCTTCAGAGCCC ACGTGGCCGCAGGAAAGTCACAAACCCTTGTGCTCCCACAGGGC ACACGTGTGCACACGTGTGCAGCTACCTTCTCTCTAGTTGGTAC CTGAGGCTGCCTCCTGGATTTTCCAGTCTCTGTGTTCCCAGACA ACCCCAAGCCCCAAGAATACAA	SEQ ID NO. 168
KCP_1305 57	AGTTTAAACGTTTCGCCTGCCCGTGAGCTCAGACCTGTCTTGGT GCCTCAGTTCTTGTGTGGAGGGGAGGAGAGGAGAGGGGAGGGGA GGAGAGGAAAGGAGACCGGGGAGGTGGGGGGGGAGAGGGGAGGG GAGGAGAGGGGAGGGGAGTGGGGGAGAAGGGGAGAAAAGCGCAG CTGGCTTCCTCACTCTCCTTTCCTTCCTCACCATCCTTACCCTG GCCCAGGGCAGGAGGAGGATTGGCAGAGTAGAGGCAGGGTCTTC TGTCTTAGCTGGGCCTGTTGGTGACTTTCTGTTGGCCAACATGG GCTGACTGGAATGTTCTCCAGCATGGCACATGGTCATCCAGATG CAGGCTCTTCCCTGGGGCACTATAGCAGAGAGGGCTCTCTTCCA GTCTATTGCAGATGGATGCCCTCGTGAGCTGAGTTTTGATGAAC ATCCCATGTCCCCAGCCACCCCATTCAGAGCCTCTTTCTACTCT GGTCCTCTGGTCCCAG [C/G] AGCAGCCCTCTGGGTACTGAGGG GAGGGCATCTCACCCAAGCCCCTTAAACCTGCTCACCTTCTTCA GAGCCCACGTGGCCGCAGGAAAGTCACAAACCCTTGTGCTCCCA CAGGGCACACGTGTGCACACGTGTGCAGCTACCTTCTCTCTAGT TGGTACCTGAGGCTGCCTCCTGGATTTTCCAGTCTCTGTGTTCC	SEQ ID NO. 169

	CAGACAACCCCAAGCCCCAAGAATACAAGAGCTCTGTCACCAAG CATCGGGCCTGTGGCTGCACTACACGTCTGCAGCTCAGGACCCC TGGCTGCGGCGTAAGCTACCAGCATCCCCTTCTCATGGCACCC TCATCTCCGGCTCCCCATCGCTGGGCTGTGACCTGCGGGGGCGC CCCTCTATGGAAGGGAAGGAGAAAAATTCACAGTGCTATCTACT CCTCTGAATGCACTCCCACCAATTTCCTTGGAAATTTCTAGCTT TCACTGACATATCTGGGATGGGGCGGTGGTCACAAAA	
KCP_1312 44	GTCTCTGTGTTCCCAGACAACCCCAAGCCCCAAGAATACAAGAG CTCTGTCACCAAGCATCGGGCCTGTGGCTGCACTACACGTCTGC AGCTCAGGACCCCTGGCTGCGGCGTAAGCTACCAGCATCCCCTT CTCATGGCACCCTCATCTCCGGCTCCCCATCGCTGGGCTGTGA CCTGCGGGGGCGCCCCTCTATGGAAGGGAAGGAGAAAAATTCAC AGTGCTATCTACTCCTCTGAATGCACTCCCACCAATTTCCTTGG AAATTTCTAGCTTTCACTGACATATCTGGGATGGGGCGGTGGTC ACAAAATCAATCCCACTTTCCCTCGGCTAGTCTTACAAGCACCC AACAGCTCTATTCAGAATACAGGGCTGCCCAGCTACTTCCCATT CATTATCCCCAGGTTGCAAGCTTTAGTCAAAACCCAGAGGCAGC AGGGTGTCTGGTTCCACCTGCTGTTAGGATGATTTCAGGAGTGC AAAGTGTTAGAAACGC [A/G] GTAAAACATGATGCTTAGAGATT AAGTGGGATGGGGACTGGGCAGATGATGCTGCTTTGGACCCAGC GAGTGAGGTGAGACTGCGACAAGACAGAGCCACTGAGCAGTGAC CTGGGGGATGGGCATTGCAGGCAAGGCAGAACCCCAAGTGGGAA CAACCTCACTGGGCTTAGCAAAACTAAAGAGGCCCAAAGTATAC TGAGCGATGAGGTGAGTGGCGTGGGATAAGGTTGGAGAGGAGGC TGGAACCAGACCCTGCAGGGCCTTGCAGGTGATGGGAAGGAGTT TGGAAGGTGCTGGAAGGTTTGAAGCAGAGGAGGGATATGATCAT GCCTGTAGCTGCTATGTAGAACAACTGTATGCATGCCAGGCCTG TGCCACGCATGCTCTAATCATTACTGGCTTTAACCCTTGCACTA ACGTTGTCATGCAGGTAGGAGCATCTGCACCCAGCAAATGGAAA CTGAAGCTCAGGAATATTCAGTCACTTGTCCAAGGCT	SEQ ID NO. 170
KCP_1318 54	ACCTGGGGGATGGGCATTGCAGGCAAGGCAGAACCCCAAGTGGG AACAACCTCACTGGGCTTAGCAAAACTAAAGAGGCCCAAAGTAT ACTGAGCGATGAGGTGAGTGGCGTGGGATAAGGTTGGAGAGGAG GCTGGAACCAGACCCTGCAGGGCCTTGCAGGTGATGGGAAGGAG TTTGGAAGGTGCTGGAAGGTTTGAAGCAGAGGAGGGATATGATC ATGCCTGTAGCTGCTATGTAGAACAACTGTATGCATGCCAGGCC TGTGCCACGCATGCTCTAATCATTACTGGCTTTAACCCTTGCAC TAACGTTGTCATGCAGGTAGGAGCATCTGCACCCAGCAAATGGA AACTGAAGCTCAGGAATATTCAGTCACTTGTCCAAGGCTCCCCA GCTGTTAGGTGCTAAGGCTGGATTCAATCCAGGACTTGCAGACT CCAGTATCTTGGCTTTTCTAACGAGAGTGTGCTAGCTTTCTAAT GGGGGTGGGGAAGGCA [G/T] TCTGCCCCCCTCCCATGGCACCG TGAGCAGGTGTCACTGCTCCAGCCAGTACGCCTGGACACCGACT AGGAAGGAGTATGTGCTACTAGGAGGGATGGTCTGGGCTGACTC TTTGAAGTTGACAAGGAGTTGCATAATCCCAGCTAATAATTATG CTGGACCAGGGGCAGAGACATTACTCCAAGGGTGACCAGGTGTG GAGAAGAGGCTGCTGACTCCGGGGCCCCAGGACCTGGCCCCCAG GTCTCATTGCCCGAGTGCTGCCCCAGAAGGAGTAGAAGCTGGAG CTGTCCGGGCCACAGCCGAGGCTGGGTGAATGCTGCAGTGAGGC TGCCGCACAAGTTGCGTGTTGTGACATTTGTCTTCTGGAGGGGA TTGGGATGGGCTACTTCAGCATTTAAAAACCCCTACTAGGTCTG AGAAATCCCCTCAGCTTATGAGCCTGGGTGGGCAGCAGGCCTTC TCAAGAAGCCCAGAAGGCCAGATGCTCACTTCCCAGG	SEQ ID NO. 171
KCP_1326 77	CAGTGAGGCTGCCGCACAAGTTGCGTGTTGTGACATTTGTCTTC TGGAGGGGATTGGGATGGGCTACTTCAGCATTTAAAAACCCCTA CTAGGTCTGAGAAATCCCCTCAGCTTATGAGCCTGGGTGGGCAG CAGGCCTTCTCAAGAAGCCCAGAAGGCCAGATGCTCACTTCCCA	SEQ ID NO. 172

	GGCTCTCTTGCGGCTGAGCTGAGAGCAGGCACCTGAGGCCTGGC AAGTGTGACAGCTGGTGACACAGACAGACAGGGACAGGGAGATG GGACTGTGCCTGCAGCGGTAGCCCTGGCCGGTGTTCAGTGGGGC CAGCATCCGTGTCTTTCCTGGGGGCCAGTGGGGGCCGTGGCTCT GACGATGCATCCCTCCCCCACGTTTTTTCTCTTCTTGTCTTGGA CTTTGCAGGGAGCACTCTGCTTTTGGGAACAGGAGCTGGGTCTC TGGCCATTCTCCGCAGCCCCTCACCATTCACTCAGTGGCTCTCA AAAAATAGAACCTGGG [A/G] CAAAGCTGTTCTTGGCCCCAAAC AACATGAGGAAAAATAAATAAATAATGTACCTGGTAACTGAGAG AGTTCCCTCTGCATCTTGGGCTCTTTCAATGAGATGTCCTCTGC CTGCAGCAAGCCCCAAGGGCTTCCCTCACCAGGACCAGCACCCT GGTTTGCCTGACCCCACACCTGCCAATGCCGGGGCAAGAATGTC CCAGGCTGCCCTGGTTCCCAGAGCTGATGCTTCCCACAGTGCCC AGCTGTGCTGGCATGGAGCTAAGGACAGGGCCAGTCCCAAGAAA ACAACAAGGCTCCAGGGCCACCGGCCACTGCTCAGGACCCTGGC TGACCCCACAGATGCGGAGTGCCTGAGATGGCTCATGGGTGACC CCCAGGCATCTGGCAAAGGTCACAATGGCTGTTTGGCTTGAAGA CAGCCCTTGCAAGATCTGTTTTGAGCCAACCTGTGGCATTTAGC CCTCCCTGGGTGACAAATAAAAAGGCTGAGGCTTGTA	
KCP_134045	ATTGGAAGATAAGAATGCAGCCAAAGAGGTCTTCAGGGTAGCGT GTGGCCTGGGCGCTGAGACTATTGGGCCTAGCAACTTCTCAAGC AGTCTATTAACCACAGCCGGTAGCCAGCTTTTCCCCGCCCTTCT CCCAGGCACACACAGCCACCTCCATCACCAAAGGTCAGGCGAAC CACCTCCCATGGCTACCCCCAGCCTGACTTGCTTTATAGAAATC ATGGCATCTCATCCTCACAACAGCCCACACTCACAGTGAATCTT GGCCATTATGACAACTGGGGACACTGAGGCTCGGAGTGGTGGAA ATTCTCAGAATCACATAACAATAAGTGTTAAAGTCAGAATTTCA ACTTCATCTCTCTAACTCCAAAGGGCGTGTGTGTGTGTGTGCGT TTCTGGCCATAATCATATTGTGCCCTACAAGCCCCAGTGAGGAA TCTGCTAGGAACACTGGTTTGGGGAAAAAATGTAATAAAATATG TGATCCAGAAGGCGGC [C/T] TTGGTACCTGTCATAAACCGCAG CATGGGGTACTCACTATGCCTGGGGTCTGGGCTCTGAAGGCATG ATTGAATGATCTCACTGCAGGCCTGGTTGTCCTGCGAAGACACC CGTCAATACATGAATATTGACACACAACGCTGCAGTGCACGCGC TTCTGGCAGGGGAGCTGCTGCACTCGAGGGCAGCTCAAGGTTAA TTTGCAGGGTTCATGTTTGGAGTTTCTGAGCAAGTGTTGCAGCT TTGGCCCCCAGCCCCCTGAGGGGAGCTCTGGCCGTGCATGAGGG TCAGACAGAAAATCTCCTTTCCTCCATCCAGGCCTGCAGTCTGC AGCACTGAGGTCAGCGCTGGCCACAAGCCCACCCTGTGCCTCGT CAGCCCCACTGAGCCTCTCCATCTATCATGCCACAGGCTGACCC TGAAATGCAAAATCATTCTGTCCTCCCGCCCTCCACTCCCACCT CGCACATCTATGGATTTGCTGTTCAGAAAACATCTGT	SEQ ID NO. 173
KCP_135518	AGTTAGATTGAGCTGGGTCCCATCTTGGGCCTTTGCTGGTCCCT CCCTAGAAAGTCTGCCCCCTCCCCCTGCAGGGTGGCATCAGCAT TCAGGCCTGGCCCTGACGCCCTCCTCTCTGGGCCACCTTCACCT CCACAACCCCGGCACCAGCACCCATCCCCACCACATCCCCAGCA CGCAGCATCTAGTAAGGGCACCAAATGCATGCCCAGACATATGA GTGAAATGAATTAACCCTGAACCTGAAAAAGGGCAACCACCACA CAAGATTCTCTAGAAACAATGTGAATTGTGCAGAAGGAAATTAA CCCTACTCCATCCAGCCCATCCTAAGGCAGGGACTTGGACCTGT TCCTCTTGATGGGGCTGGGGCTGAGGCGGGCAAGGCAGGCAAGT GCTGAACAGTTGGCAACATTGCCCATCCCGTCTCCCTGCACCAG GCTGGGCCTGGGGTGAGGGGGTGGGGGCCGGGGTAGCTGGGCTC CTCCAGCAAAGAGCAG [G/T] ACTGAGTCCCTGGTGACTATTAG GTAAAAGGTCCCTGACAATTTTGAGGGGCCAGATGCCAACTCGA GGGATACAGAGAAGATCTAGGCACAGTCTTTCCCCACCATGTCA GACAAAAAGGTTAGATACAGGACCTGATATGTTATAAAACTCAA	SEQ ID NO. 174

	TCAATATTTACTTAGTGAATAAATGGACGGATGGATGGATGGAT GCATTAGGCAGCCAAGTGGGCAGCACCGATGACTTAATGTACTG AGTGCTCCGACTCCAGCAACATGCATTCATTGTTCCTACTGTGT GCCAGTGAACAAGAGCAATGAACTCAATGACTTCTGCCCAGGGT GGGCCAGGGAACCAGGGAAGACTCTCCAAAAAGGCAGCATTTGG GCTGGGACGTACAGATGAGTAGGGGTCGAGTGTGTCGTTATGT CGCTGGAGCCCAGAGGCGTCCATCAGGACTTGGGGGAGGGCAGA TGAAAGGGCCTTACTGCCTAACTTGGAGCCACTGTAT	
KCP_136036	CCCATCTTGGGCCTTTGCTGGTCCCTCCCTAGAAAGTCTGCCCC CTCCCCCTGCAGGGTGGCATCAGCATTCAGGCCTGGCCCTGACG CCCTCCTCTCTGGGCCACCTTCACCTCCACAACCCCGGCACCAG CACCCATCCCCACCACATCCCCAGCACGCAGCATCTAGTAAGGG CACCAAATGCATGCCCAGACATATGAGTGAAATGAATTAACCCT GAACCTGAAAAAGGGCAACCACCACACAAGATTCTCTAGAAACA ATGTGAATTGTGCAGAAGGAAATTAACCCTACTCCATCCAGCCC ATCCTAAGGCAGGGACTTGGACCTGTTCCTCTTGATGGGGCTGG GGCTGAGGCGGGCAAGGCAGGCAAGTGCTGAACAGTTGGCAACA TTGCCCATCCCGTCTCCCTGCACCAGGCTGGGCCTGGGGTGAGG GGGTGGGGGCCGGGGTAGCTGGGCTCCTCCAGCAAAGAGCAGGA CTGAGTCCCTGGTGACTATTAGGTAAAAGGTCCCTGACAATTTT GAGGGGCCAGATGCCAACTCGAGGGATACAGAGAAGATCTAGGC ACAGTCTTTCCCCACCATGTCAGACAAAAAGGTTAGATACAGGA CCTGATATGTTATAAAACTCAATCAATATTTACTTAGTGAATAA ATGGACGGATGGATGGATGGATGCATTAGGCAGCCAAGTGGGCA GCACCGATGACTTAATGTACTGAGTGCTCCGACTCCAGCAACAT GCATTCATTGTTCCTACTGTGTGCCAGTGAACAAGAGCAATGAA CTCAATGACTTCTGCCCAGGGTGGGCCAGGGAACCAGGGAAGAC TCTCCAAAAAGGCAGCATTTGGGCTGGGACGTACAGATGAGTAG GGGGTCGAGTGTGTCGTTATGTCGCTGGAGCCCAGAGGCGTCCA TCAGGACTTGGGGGAGGGCAGATGAAAGGGCCTTACTGCCTAAC TTGGAGCCACTGTATGTTTCAAAACAAAGGAG [A/C] GAGAGGA TCCTGGGAAAGAGAAAGGGTACTCTAGGCAGAGGATGTGAATGG GCACAGCACAGGTGAGAACATCAAGACCAGGGGTCAGGGAATCT ACTGGTAAACAATTGTACCCCAAGGGAGCAATCACAGCCTCTCC ATCCACAGGGAAATGCCTGGTGGGGAGGAATGGGAGGAAAGAAA CAGATTGCATGACTGTGTCTTGAAGGTCTAATTCCAGAGTACAG CATCACCCCTATCTTCCAGGTCCAGAAACTGAGGCTCAGAGGGA GACTTTCTGATGAGTGCAGCGTGCAGATAAGAGCATCTCCAAAG CTACCTCCTTCCCCAGTCACACCAGGGCATAAGCAACTGATAAC AGCTGTCAGCACGGGACAGTGGAGGGAACACTAGGTTAGGAATA AGGGTACGAGGCTTGAGTACAGATTGTCAATGACTCAGTGTGTG AACTTGGTCAGGTGACTCCAACCAGATGACTTCCTTCTCTGAGC TTCTGTTCCCTCCTCTATGAATGGGGACAATCACTCAGCTTCAC AAAACAATGGCTGCGAAATTGCCTGGTACAAGAGAGAGAACTTC CAGTGTGTAGGGGCTGTTGTCCTAACTGCCCAGCCCCCTAGATA GGTAGTTATGTCATCTGTGAAATGGGTGTTAGAATTCCTACCTC CCAGGACAGCTGTGGGCAGAAAACCAAAGAATGTGTGTGAGAGC CCAAGCACCATGCCTGGCACATAGTAGGTGCTCAGGAAAGGCTG AGGGTGCAGCTGCTGTCCACACACATGGTACCACTGCCCCAGGA AGGGGCTTCAGGAACCAAGAGCAATTCTGAGCACTGGTGACTGG ACTCTGCCATTCTCCATTTCAAACGCTTTTTGAAAGCAGCTCCA GACCCAAGCAGGAGAGCAGGAGGCAAAAGAAACGCAGGGGCTTT CCCGAATGGAATTTTAGAAACACACAGAATTGTCTCCTGCACAG AAGGGAAGCTGTCTTCCACAGCACA	SEQ ID NO. 175
KCP_137660	CACTGGAGCTGAGACTCCCAGGTCCCCTAGGGCTTCTCTCCCAG GGGCCTCTGGGCTCCCCAAGGCCACGTGCTGCCCCCACTAGAGA CCTGGGCCAGTCCTGACCAGGGGAAAGAGTAGCGCCGACAACAG	SEQ ID NO. 176

	CCCCAGATGGTATGTGCACTGGCACATACTGGCAGCTGCCTTCA TGACAGCAAGCCATAGGTCCAAATCCCGCCCCTTCACAGGGACA TTCCCAACTGGTCAGGGGTGGACCTCCCCTTCCCGGCTGTCTTT GGTGTCCAGGACGATTTGCCACAGACAGGGGGAGCTAAAGGGGC CCACGCTTGAGGCCGCTCAGCTCTGAGTCCTCGCCGGCCACAGA GGACCTTCGTGCCTGTCCTCTGTCCTCCTGCCCAGTCCCCAGGC CAGGCTCAGCTGGAGTTGGGGAGCAGAAAAACACGCATCTGAAT CAAGGCTCTCGGAGCCTTTGCTTCTGCCTCCAAGAGGCGAGGGA AAATGAATACCCAGGC [A/G] AGCGAGCAAGAGAGACCCTCAGA AAACCCCAGATGCCCCTGGAATCAAGCCCTGTCCCACCAACGCC ACGTGGATTGACAGGCTATTAGTCTTCCTGTAATTAGGATTCTC GCCTCAAATCTTGTATCTTTTTCCCCCAGAAGATTCTCCTCCAG CCTTCACCACTGCCCCCTGGCGCTTCCTTGCAAGGCTTTTGAAG AATCCTTTGCAGAGAAGCAGCCTCCTTTGGCAGGGGCTGCAGAG CACTCTGCCTCCCTAGGCCAGGGCGAACCAACAGAGGCGGGAGA TGAGGAGGAGCAGCGCGGCTCTGCTGCGTGGCCCTGGGCAAGCA CCACAACCTCTCTGGGCCGTTTGCACATTCTTACCGCCAGGGAT GTGGGCGGTAAATGAAAGAGACCAGCACAAACCAGTGTCAGCTC CCTTCCTCGATTCCTAAAATGTGATGCCCAAAGATGGGCCAGCC TCCTGCTGTGCCTTCTCTGGGGGGACATTTAATAAGT	
KCP_1436 12	TGGCCGCCTCTTCCAGATAACAACTCTCCTCTCCTTCCCTGCCC TCCTGCTCCTCCTGTTCGCGCTACATAACAGACTCTGTGGGGCC TTGGTTTATGTATTTCCTTCTCTCCCCTACTGAAATACATGTGA GCGATGCTGGGGCAGGCCGACTAGAAGAAGCAGACTATCTGCTT CTTCTCCACCCTTAGAATGGTGCTGGGCCCAGAAGAGGCATGCA GTCGATATTTGCTGAATAAATGAATGTCAGATAAAGTGGTGTGG GGACTCCAGGGGAAAGATTTGTCATTCTCCACCCTCCCAGTTCA GCTTAAAGCAGAGAAGTGAGAGGTGCCCAAAAAGGGGTGTGTCT GGGGGGTGGGGGGTGGGGATGTTCCAAGATCTCCAAGGCCTGGA TTTTAAGCAAGGTTTGAGATGCCAGCAAGAGGGCCTGGCATTGC CAGATTGATAGTCTGCATTTCAGAGAAGGACAACCCCACCTCTG ACCTTAGCCC [A/G] AGCCTCAACAGCCTGCTCAAGGAGATCCA CCCTTAGTAGGAGGAGGCAGCCAGGCCAGGTTCCAGTCCCTGCC ACCGCTTGCCAGGTGTGTCTTGGGCAGCAGTTGCCTTTGCTCGG TGGTCTTCAGCTTTGCCCCCTGCCAGGCACGTGCTGGCCTCCTG CCTGCATCGTAGCTCATGGAGTCCTCTCAGTCACCTCTGTATGC CCTGCAGCATCCCCAGTTCTCAGTGAGAAGAGTGTGCTCTGAAA GTTAAGTAACTTACCCAAGGTCACACAAGGTCTGAGTCTCAAAT GCATACAATTTGACCCCATAGTCTAAGGTCTTGACCGCAATGGA ATAAGAAATTATTTACCATTCTGAGTGGCAGTCTCTGAAGACT ACAGCAATAATTGATGCCTCTCAGGGGGATAGGTGTGTCACTTA CAGGTGATAGTGAGGTTGTCCTCAGCCTCCCTGCTCTTCGTTAG ACCTCCCTCCTCCTCTCTACCCGGGCCAAGCGT	SEQ ID NO. 177
KCP_1449 60	GCGGAACACCTCTGCCGCACCTGCAGCAGCCTTGCTCTATTTCT TCACAAGCTTCCCCATGACACTGACCCAAGGCTGTCTGGCCACT ACAGCTGCTGATGATGATTAGCAATAATAATAATAATAAACGAA ATGCCTTCTGCTTAGATCATCTTTAATTTCCCCTCCAGAATGAC ATTCGACTCTGCTTAGAGTTACAGGCAGCCCAGCAATTACTGAG CGCAAATACCGTGTTCACCCGCCTCACCTCATCCACGCCCCCAC AACACCCAGCCCTGAGACTGGCTCCACGATCACCTCCACTTTAT AAAATAAGATATCAAACTCTGAACAGAACGGACGTCTCAAAAAA TGGGCATATTACATTTAAACCCTCAATCTGTTGGGTATTTGAGT GAAATGGACATACCTCCAGGGAGTCGGTGGCGAGGGCCGGCTCT GAGGACTTCCTGGGTTGGGATCCTGGCTCTGCAGGACTGCGTGA CCTTGGTGAGTTACTT [C/T] ATCCCTCCAAACGCGCTGTTCTC CTTCATAGAATGGAGATGACCACAGGGCCAGATTCATAAGGTTG TTCCTTGTAATACAGGTGAATATCCATACCCAGCAACTGCTGGA	SEQ ID NO. 178

	CCACCTGTGGTTTCAAGGATAATTTCCCTCCCACGTCCCCGTGG CCCTTGGAACCTTCCTCTCCTCCTGTCTCCCCCTGCCCCCATCA CTTTGTAATTGAAAAGTCATGATTGCTCTCCCAGGTGTAGCACT GCTCACAGGTCAGATTGCCTGCTCTGACGTAGTGACTCAGTTGG ATGCGGTTCAGCTGTGTATGATCAACTCCCTCCCCCTGACAAAA ACATTATTTTGCATCACAGAGAAGTTGATTTCTTTCACACATAA AAGAAGGCAAAAAGTGGTGCCTAAAGGGCTGGTACAGCAGCTTC AAGAAATCAGGAAGAACCTGGGCTCCTTCTGCCTTCTTGTTCTG CCAATATCACCCCATGGCTGCCACTTCATGGCCCAAG	
KCP_1467 46	TTGTGAGTAGGGCACGCAGGGAAGAAACCTGTTCAACCCAGCCC CGTGCTAGAAAGACATCAGCAGGGCCTGCAAAAGCCCTGATTAA ATCTCACAAGTTTGCACCTGGAGCCGCCATCTTGAATTGCAGGT GAATATCAGCCTTTGGTTTGGGCTGTGTGCCCCAGATGATGGTG GTCCCAAATTACATAGGCCAATATCCAGAGCTGGGTTAAAATGA AGCATTTCGAGGAAAAAAATGCAATGAAATTTGTTTAACCGGTA CTTCAGGCTTTTGAGCACAGAACAGCGTCCATCCCTCCAAACAC ACACTGAGGATATACACTTAGCCAGGAGGGAACATAAGGAGGGG TGGACAAGCCATGTTTACTAAAATCTCTCAGTGTGTGCCAGGCA TGTTCATGTATATTCAGGAAGAAGTGTCAGTATTTAAGATCCTC GGCCCTTGCCCGAGTCCCCAACACGCCTTCTTGTCTGGAGAACT GTAAATCTTGGAAACATCTTGCAAGGGGGGACACCTCACAGAAG GCAGGCTTGGCATGGGATAAACAGAATCGACTCCTCTGCTTCCT TCTGATGCACAGTGAATGGGCAGGTGGAAGCATCGTTGCTTAAA GAGGAACCAAAACTCCACCCCAGAGCTGCTAATTCCTTTTGGCT TGCAGTTATGCAGAGGGCTAAAAAATCCAACGAATCACAAATCC CCTGGTTGCTAAGTAGAAAGAATATGTTTTGGCTGCTGCTGTTC CCTTCCCCAAGGAAAAGATTCAAGCAGAGGCGGTCCCCACCTCT CAACACAGAAAGCAACATCTCTGATTGCCTCTAGACACACCTTC ATGCTCGTGGCACTTTGGGACCCTCTGCCCGCTGGCTTATGGGC ATGGCTTCCCCATCACTCTGGGTCCTTGGGAAGAGCCTCTTTCC CAGACCCCACCTCTGTGCCTCATCACATTTCTCCCAGGCTATTG ACTTGTTCAAGGTTAAGGTATGAAGAGAGTCA[C/T]GCAGCAG CCCTACCTGGCTCTGCTCTGCTGGGGGAAGCCTTTTCAGAGCCT GCCTCTTCCTCAGCATGAGGGGCTGCTCGGGCCCAGTCCCAGAG GCCATGCTGGTCCCAGGGGAAGGTGGCCGTCATCCCCATCTGTG TTTTCTCTTGCAGGTAAGTCATGCTCCAGCAGTCGGGAGGGTTG TGTGATGACACACTTGGCAGTTTGGGAGCAAAAGCCGCCACAGT AAGACACAATTGATTCATTGCCTCTCAACCCTCTGCTGGGGTGG ACTTTCATGCGTGGACTTCTGTCCCCAAAGAGGCTTCTCTGGGT CTGGAAAGGGCCCTAGCCTTGGTTGGGGGAGGCAAAGGGGTGGC GGCTTCCAGGTACCATCTGGCCAGGAACCGGCTCCATTGTCTGT GCATGTAGCTTGCACTGGGCTGCCTGCTCCAAGGGAGGCATCTC CCCACGATCTACGACATTGGCTTCAAAGAGCTGCTCCTGGCAGC TTCGAATGGCTGAGACCTACTGGCATGGGATGGAGGAGTGCAGG GAGCTTCCCGGGACCTCGCTAGTCCTGCCTGGATGCTCAGAAGG CCCTCGTCCTCGGTGGCATGCAGCCTCGGCCATTTCCAAACTCA CGGCATCTCACCCAGCCATGTCACCCACCCCCGGCTCTGTCGCC CTTCCCATCACCTTTCTCCCACCCATCACCTCACATCAAGGTTT CAGCCAGCGGGAACCAGGTTTAGACTCCAATTACCTGTGCGTGT GGGAGGTTGGATTGTGACATCTTTGGAGGGCCGGGCTTCTGAAG CGACATTTGATTTCTGGTACTGAAATGTCAAAGGGTCCTGAGGC ACCCGCTAGGGCAGCACGCGGAGCATCCACCTGCGTGCGCATCC TGGGCTCTCTCTGGGCCACTTGGTGCTGGGGACATGCCGGGAGC TGGTGGTCAGCCCTCCTCCTGCCTCCTCAGTGCTGCATCTTCAC CTTCTGCAGCTGCCTACCAGAAGCA	SEQ ID NO. 179
KCP_1492 16	ACACCTTGACTTTAGCCCAGTGCAACTGACTCCACATTTCTGGC TCCAGAACTGTAAGAGAATACATTTGTGTTTTGTTAAGCTAGCA	SEQ ID NO. 180

	AATTTGCAGTAATTTATGACAGCGCTATGAGAAACCAAAACACC AGGATTATGCCCCAAGGATCCTGATGCCCTCCCTCCTCTCTGCT CTGCAGTGTGCTGGAGCTCACAGGGCTCTGCTGCTGGGAGTTAG TATCTAGTCCAACACTTTACCCACTCACCCCCCAAGCTAAGGGA CTCCTGAAATCAGGGACCAGATGCATAATAGGTGCCCAGGAAGT GAGACTCGCCTTCCCCAGATTAAGAATAAAGAAGACAAACTATC CACGGCTGCTGTGAGCCTCTCATCAGACCTCAGCTTCTAGGGCA GGGTCCCTGCCTGTCTCCAGTATGTGGCCTCTGTGTCTTCTTCG CCCTCCATCCCCACAGTGGGACGAGAAGTCATCAGGAAGGCAGG GGATCTGCAGGCAGCC [A/G] TCAGGGCTCTAATTGCAGCTGGC TGGGGGACCATGGGTCAGGGCTGCCACCCCCTGGCTCTGTGCCT TCACCTGTGTAACGAATGGGGCACTCACAGCCCCTCTCAAGTGG TCCTGGGGATGAAGTGAGAAGGTGACATATACAAGTGAGTTATA CACGTTCCTGTTCTGTCACTCACCAGTGCTCACTGGGTGGGTCA CTGAACTCCCCTCAGCGTTTCCTTCTCCATCTGTAAACCACCAG TGCAAACCTTTCCCAGATAGTGCTGACCCGAAGCAGGAACCAGT GCCCCTCTGCCCTCAGTAAGTCTGCCAGCAGAGGAAGCCCATAG AGGGTCTTGGGAAATGAAGCCAACAGAGTCAAGAGGGTCAGATG ATGAGGGACTTCAAGTGCCACCTTCATCCCATTCTTTCTGCAAA TATTCACCACACACCTACGTGACCTCAGGCTCTGTGTCAGGTCC TGGGGATGTAATGGTGTCCATGAAGAAACAAGGTCCC	
KCP_1495 35	TCCCCAGATTAAGAATAAAGAAGACAAACTATCCACGGCTGCTG TGAGCCTCTCATCAGACCTCAGCTTCTAGGGCAGGGTCCCTGCC TGTCTCCAGTATGTGGCCTCTGTGTCTTCTTCGCCCTCCATCCC CACAGTGGGACGAGAAGTCATCAGGAAGGCAGGGGATCTGCAGG CAGCCATCAGGGCTCTAATTGCAGCTGGCTGGGGGACCATGGGT CAGGGCTGCCACCCCCTGGCTCTGTGCCTTCACCTGTGTAACGA ATGGGGCACTCACAGCCCCTCTCAAGTGGTCCTGGGGATGAAGT GAGAAGGTGACATATACAAGTGAGTTATACACGTTCCTGTTCTG TCACTCACCAGTGCTCACTGGGTGGGTCACTGAACTCCCCTCAG CGTTTCCTTCTCCATCTGTAAACCACCAGTGCAAACCTTTCCCA GATAGTGCTGACCCGAAGCAGGAACCAGTGCCCCTCTGCCCTCA GTAAGTCTGCCAGCAG [A/G] GGAAGCCCATAGAGGGTCTTGGG AAATGAAGCCAACAGAGTCAAGAGGGTCAGATGATGAGGGACTT CAAGTGCCACCTTCATCCCATTCTTTCTGCAAATATTCACCACA CACCTACGTGACCTCAGGCTCTGTGTCAGGTCCTGGGGATGTAA TGGTGTCCATGAAGAAACAAGGTCCCTGCCCTCATAGAGTGGCC TGACATATGCCCGAGGCAGTCAGCAGCCGAGTGCGGGAGACTCT TGAGCAGAGATTGAGTGTGTTGATATCTGTAGGCATCAGCCTGG CTTTGCTGAGTGAGCTATATCAGAGTGGAGGAGGCCAGAGGCAA AGTCCAGACTCCACTGGATCCTGGATTGAGGGGAGAAGGGGCTG GGCGGAGGAGCAGCCTGAGCACCTGCATCTCACTCCAACTGGGT GCTGATTTGTCCCCATGGCCCCAGCACCCAGGCAGGTCACCAAG TAAGCTCAAGACAAAAATGATGAGTGACTCAACAGTG	SEQ ID NO. 181
KCP_1567 32	ATAAATTGGATTTCATCAAAAATTTAAACTTCTGCTCCAAAAGA CACTCTTAACAAAGGGAAAAAGCAAGCCACAATATGAGAGGAAA TATTTGCAAAGCATCTGATAAAACATGTGGATCTAAAATATGCA AGGAGAATAACAACTCTATTTTCCACTAAGGAATGAATGACTGT ACAAGGACCACATTCTAATTAGGAGCTTCTGAACCCAAAGGAAT TTCAGATAAGGGGAAATTTAGGCCCAAAGCCAGGAGAAGGGGTG AGTAGGGCTTGATCTCTGCCTCTGAAGGGCAGAGGGCGTGGACT ATTCTTGGCTCTTAGGGGACAGCTAGAGAAATGTGGGTCTCATG GCGACAACTCTGGACTCCATTGGAAGAACCTTCTAACAGTCAGG GCTCCCAGAGATAAACTAGACAAGTCACCAAGAGAGGCAGTGGG TACCCCTCACAGGAGGGGTGCAAATCAAAGCCAAGGCTTGGAGT GGACCATATTAAATCC [A/T] TTTCTTATCCTGTGATTCTTAGA GTCCTATCTGTATCAGGGGAAGGCAGGTGGGTTCTAGAACTTTC	SEQ ID NO. 182

	TAAATGTGTCCCTGTGGGTTTTTCCTTCTCCAGCTACACACAAA CTTGGGCCTAATAAGAAGTCTATGGCATTAACCCAGCAGGAATG CTTAATGCTTATATCTGACCTCAAACCAAGACTGTCTCCACAGT GAACAACCCCGTCCTGTCCCCTGGCGTCTCCTTAGCAAATGCC ATCAGTCAATGGTGCAGCCATCTTGGAGCCCTTGCCATCTATAA TCTTCTACCGCCACCCCCCCAGCTGATTGTTTTCTTTGTATGTC TCCTTCCTGGACATTACTTATTCTTTACTTTAAATATTTGCTT CCGTAAAAAAACAAATGAATGCCTCGGACAGATTTATAAAGAAC ATTCCTGGAGAGGCGGGTGGATTAATTATTCAGCATCCTCTCCC TTTGTAACTATTTATTGTCTCATATGCATTTATATGG	
KCP_158617	TTGCCCAAGTGATGTTCCATGTCAGGCTCTAGGGTCCCTGCAGG GACAGAGAGGGACTAACATTTACTTACATGCCTATAGTATGTCA GGCATATACTTGTGCCTTTATATATATCAGCTCTGTTTTTGTCA TTAAAACATCCCTGTAGAAAGATAGGCACTGCTGTCCCATTTTA CAGATGGGGAAACCCAAGCTCTGAGTGGTTCAGCAAACCCTGGG TGCATACCCCCACCTTGCCCCTGCAAAACCAACAAAAAAACGAA GGCCCTGCCTTCCTGGAGCTGACATTTAGGTTGATTCTGAAAGT CAGTAGGCCCAGATTTTCACTCTTCATTTTTCTTGTTTGGAATG AGAGAGCACACAGCTGGGTCGGGGGAAGGAGCGAGGGTCTAGGC CTGCATCCACTCACCCCAAAGGAAAGGAGTAGGGGACCAGTCTG CTGGACATGCAGACAGCGATTGGAGAAAAGTCAGCCCAGCTATG AACCCCATTCCTTTCAGTA [C/T] GAGCCAAGAGGGATGGCATC TGTCAGAGTTGCTGGATTTGGGATTTTGCATCTTGCCAAGTGTC CATGAGGAATTGGGGAAACTCTCCCCCTGGCTGGACTGAGGCTT CAGCAAGCATTGTTGCTGCCCAGTGGTGATCAGCTCAGTGTCCT TGGAAAAGAGCAGAAAGTGGTATCACGAACATATCTTCTCCTTT GCTTCCTTCTCCTCACTCTTCATCATCATCATCATCATCATCAT CAAATATGGATCTGTGAGGCTACCTCTGGGGTTGAAACTTGGTT TTGGGCAAAATTTGTGATGTTCTCTCTGCCCAATCCAGCCTCAG GCTACAAATGAATGTAAAAATCTCTAATTTAGTGCCAAGTAACA GAAAACAGCTCTACTTATCTTAAGCCAAAAAGAGGGACTTCTCA GAGGCATACTAATGGAGGATGGCAAGAGGGCCTCACGTGGAA	SEQ ID NO. 183
KCP_160145	GCTCTTCTGCTGTGGAGGATCCATGCCATTGACCTAGGCACCCG TTTTCCACATATTGAGCATTGCTGAGCACCTATTCTGTGCCAGG CACTGTGCTTCAGGGCCATGGGGGATGCTCCAAGCGGTAAAATG CAACCAAAGCCCCGAAGGAGCTCACATTCTAGTCATGTCCACAA AGAGGTAATAAATCCATAAATTGTATGTACTATTCTAGTCACAA TAAAATTGTGTCGTACTGTAATGCTGGGTATCCATTTTAAAACG GGGGGCATCGGCTGAATCTGGGTCATTACAGTAGGAAATGCATA TATATAATCATTTACTCATGAATATTAATGTATTTAATGAGGGT AAAAGATATTACTTAAAGCAAAGTATTCGTTCCAGCTACTGTTG GATTTGTTCATTACTGTTTCCCATGCAGATATTACCTGTGATTT ACCTGCATATCAAGCATCTGGAAGTAGCTCAAATCCACCTGTGG GTAAATTAGGTTAGCC [A/G] TTTGTTGGCAAAAATTACAGTGT TAACTAATTTCCAGGGTATGCTTGCAGTCAGTAGTTTCATACTT AGGTACATGACTTGCATTCACATCATCTGGTTAATGGTGTGAAC AGAGATTTTCTTTATGGTTTTTGGAATACAGTAAGATAATGTTA AGCTAACGTAAGTCTGTTAACAGTACCTGGTTCTGAACTGTATT TATAAGGTGTATCATAAAACCATTACTTTGGAGTTTGCCAATCT TAAATTCAGAACAATTCAAAAATGAGCCAGAATCTAGTTTGCAT CATTACCACTTATAAAAATAAGGATCTGTAAGTTGGCTGGATAA AATATATTACAAAATAATGACTTAAGTGGCTCTGGAGCCAGCAC AAAAGATAAAAATTGGGTATACTCAAAATTACCTTCAAAATATC TTAAGTCATTCTTAAAATACATGTAAATATGCCAACTCAAAATA CATCCAACAAAACTAATATTTTTCCCAATTTGTTGGA	SEQ ID NO. 184
KCP_1648	TCGACGTTTCCAAAGTCATGGGGCCTATGGTTTGTGAGCTTATT	SEQ ID

97	TAGGTTGTCCCCGGGCCCAGCATCAAAAGCATTGAGACACGTAC TGAGGGACTCTTTTCCTAGCCTCTCAGTCCTGACTGCTCAAGGA CCAAGTGGTACTTCTTGCCTGCGTTCCTTTAATGCTTGCCTAAT ATGAGCTAGTCTTCTCTGATCACTTTTTTTTTTAATCCAAAGTA GGTGGGCATTGTCCCAAGAGCCTTTGGAAAGCAGCTGCCTCTCA CTAGGACTTCACAGCATCATTTTGCTTTGCTCTCTTTGTGGTTA AAATTACCTTCCATTCGTGGTGGGTGTATGTCAGGATCCCCACA AGAAACAGAGGGACACCCAAATTAGGGACATACTTCAGAGGGAC TAATGACAAAGGCATGGGTGGGAGTAGAGGGGAATACAAGGGAG ACTTCAAGAATCTTGGCCTTTATTATAAATGCAATGTATGTCCA CTATGGAAAATTTGGG [A/G] AAAAAAGCAAACTAGAAAGAAGA AAAACCACATTGCCTGAATTCCTACTGCATGGAGAGAAGCATCA TAAACACCTTTTGGAGGAGTCTCTTCTTCCTTTCTCCCTTTCTC CTTCTTTGTATAGAGAGGTCTTTCCTGAGGACTTCCCAGAATCT TGCAGATCCAAAATCTTAAGAATTTGCAGAGGCAGTGAGGAGTT AACATGCACAGCTCAGGGAATATTCTGCTTTTTATCTGGAACCA GGCTCGGAACAAGACTCCTTGCTTTTCTGTCCTGTGTTTTCATC TTCTCTCAGAACCCTAACTTTGAGATAAGATCTTTGACTATTAT TAGGCGGGTGCAAAAGTAATTGTAGTTTTTGGCATTATTTTTAA TAGAACTGCTTCTGTGTCCTCAGATCTCCATCGTTCATCTCCTG ATAAGTCCCTGAAAATTTCCTGGCCCCTTGGAGCTCCTTCCAGG AGTAGAATGATCACAAGAGCTGCCATGTATTGCTTAT	NO. 185
KCP_1692 34	TTGCTTATTCCAACTTGGACTTGCCGGAGTCCCATAGACAGAGG CTACTCTCCCACCGTGCTGAAGCTGGTGCATGCCATGTTTCAGT AAGAGAAAGGAGGGTGCCTGGGCTTCGTCTCCACCCAGGTGCCT CTCCCCCAGCAGCTGCACCAGGCCAGCTGAGGGGGATTTTAGCC CGAATCCAGGGTTTCTCCTACAGAAGACAAGGAGTTTGGGCACT GCCAGAATTAGAAGAACAGAAAGAAAATGTTCTGGATTTCTCAT CAAATGCCCCTAGCCTGAGAAATATAACTAAATTCACCCTTAGG TCATCTTACAATCTGTCCTGCCCCAGTGTTCCCCACTCAGGGAA CTGCTCCACCCACATCCTGGTCCCCAAACCAGAGGCCTGGGAGT CACCCTTGACATTTCCTCCCCTACACCCCTAATCAATCAAATCC TGTTTATCCTGCCCTCTGAGAGTCTGCACCGAAATCTCTCTCCT CTCCTTCCCACCTACC [A/G] TGGCCCAGCAGCTTTACCATCAT GTCTCACGGATCTCTGCACCGCTCCCAACTGGCCTGTGCGTTCA CTCCTGCCCCCTCCTCCAGCCCTGTGTACACTCCCTTCCACCAT CCTTTCTATACTCTCCTCAATCCTATCTGCACCCTCCTTCAACC CTGTCTGTACTCTCCTCCAATCCTGTCCACACACTCCAAACAAA GTCATATTTCCAAGACAAATTTGACCATGCCACTTTCTCCCACA GCTCTCCACCACCTCCAGGATCCCATCCTCAGTGTTAGCCAGAC ACTCCCAAGGCCTTGTGATCTGCCCTGCCTATGTCTCCAGCCTC ATCCTGCAACTCCCCCTACACTCTGTGTTCTGGCCATCAAACCA ATGGGCTCCTCTTCCTGCACCCCCATCCACTCTTGCACATCCTG CACTCTATGTCTGAACAGCTCGGTTTCTCTTCTTTTCTTCTGGC ACATGTCTGCTCTACCTGCAGGTCATCTTAGATGTCA	SEQ ID NO. 186
KCP_1738 48	AAAAGGGAATTTATTGGCTCATGTAACTGAACTTCAACATTTTA CAGAATCTCATTGGCTCCAATGGGCTCATACGTCCATCCCCAAA CCAATCACAGTGACTGAGGGATTATCCAAGGATCACACTGGCCA CTTTCACAGGTTTTATCCCTAAAGGAAATCACAGGTAATAGATG TGGGGCTGCAGAAATGCAACATGCACTTTTCCTTGAAACTGCAT CCCTTTTCCCTGAAGATGAAGCTTGAAAGAACTCTAAGAGGTTA AGCATGGAGCTGATGGGCAAGCCACAGGCAGAAAGAGTAGCTGT GCAGCCAGGCTCCTGGCCAGGGAGGGCAGATAAGGAGGGGAGGC AAAGTTTGGTAAACAGGAAGCTAATCTATGGGCAAGAATCATTT TCTTCAGCATCCTGACCTCTCCTAAAATGTTCTCCACTGGTCCC TGCTAGGACAAAGGAATTACCACCAGACTAGAGTCAGGAGTCCT GGGCTGGTTCTGCTGT [A/G] TGACACAGGACAGGTGGCTTGCC	SEQ ID NO. 187

	TGGTCTGGGCCACAGCCTCCTCCCCTGTTGATGAGCATGTTGGT TGTTCCAGCACCATGTCAGCCCTAGAAATCTCTGAATTCTTGAC CAGATCAGTAATTGCTCTCTTGCGTTTACTTTTCCTTCAAATAA AGAGATTGGCATACAGGGGAGGAGCCCAGTACAGACGGCATGCT TGGCTCAGGTTCCAGAACCCAGAAACCAGACAAGAGTTGGGAAA CCATGATGGTGGAGGAGGGTGTGCCACTCCTTACTAGTGCCTAA TCTCTTCGAGACACTAATGTTTCAGTATTATCCACAGATTCTGA TGCCAGGCAGCCCAGATGACTGGGGTCAGTTATTAGCATGCTTC CTGGAGGTGGTTCCCAGGTGCAGGCTACCTGCAGTCTGGCTGGA TGGGCCCTGCACCACACTTGCTTCTGGGAAGCTGGTTTTGGGGT TGCCACAATCTCTGAAAGAATCACTAGGCCACCCTCT	
KCP_173982	TTCACAGGTTTTATCCCTAAAGGAAATCACAGGTAATAGATGTG GGGCTGCAGAAATGCAACATGCACTTTTCCTTGAAACTGCATCC CTTTTCCCTGAAGATGAAGCTTGAAAGAACTCTAAGAGGTTAAG CATGGAGCTGATGGCAAGCCACAGGCAGAAAGAGTAGCTGTGC AGCCAGGCTCCTGGCCAGGGAGGGCAGATAAGGAGGGGAGGCAA AGTTTGGTAAACAGGAAGCTAATCTATGGGCAAGAATCATTTTC TTCAGCATCCTGACCTCTCCTAAAATGTTCTCCACTGGTCCCTG CTAGGACAAAGGAATTACCACCAGACTAGAGTCAGGAGTCCTGG GCTGGTTCTGCTGTATGACACAGGACAGGTGGCTTGCCTGGTCT GGGCCACAGCCTCCTCCCCTGTTGATGAGCATGTTGGTTGTTCC AGCACCATGTCAGCCCTAGAAATCTCTGAATTCTTGACCAGATC AGTAATTGCTCTCTTG [A/C] GTTTACTTTTCCTTCAAATAAAG AGATTGGCATACAGGGGAGGAGCCCAGTACAGACGGCATGCTTG GCTCAGGTTCCAGAACCCAGAAACCAGACAAGAGTTGGGAAACC ATGATGGTGGAGGAGGGTGTGCCACTCCTTACTAGTGCCTAATC TCTTCGAGACACTAATGTTTCAGTATTATCCACAGATTCTGATG CCAGGCAGCCCAGATGACTGGGGTCAGTTATTAGCATGCTTCCT GGAGGTGGTTCCCAGGTGCAGGCTACCTGCAGTCTGGCTGGATG GGCCCTGCACCACACTTGCTTCTGGGAAGCTGGTTTTGGGGTTG CCACAATCTCTGAAAGAATCACTAGGCCACCCTCTGAGTGGGTC CTTCTGTAGGAATTATGGATAAAATTGTTCCACTAGTCTTACCT TCTTGGGGAACCCTTCCTGGATTCCCAGGCTGGGCTGGGTGTCC CTGCAGCCTAGCCCCACAGCCCTCCTGCTTCTCTTTC	SEQ ID NO. 188
KCP_174243	TGACCTCTCCTAAAATGTTCTCCACTGGTCCCTGCTAGGACAAA GGAATTACCACCAGACTAGAGTCAGGAGTCCTGGGCTGGTTCTG CTGTATGACACAGGACAGGTGGCTTGCCTGGTCTGGGCCACAGC CTCCTCCCCTGTTGATGAGCATGTTGGTTGTTCCAGCACCATGT CAGCCCTAGAAATCTCTGAATTCTTGACCAGATCAGTAATTGCT CTCTTGCGTTTACTTTTCCTTCAAATAAAGAGATTGGCATACAG GGGAGGAGCCCAGTACAGACGGCATGCTTGGCTCAGGTTCCAGA ACCCAGAAACCAGACAAGAGTTGGGAAACCATGATGGTGGAGGA GGGTGTGCCACTCCTTACTAGTGCCTAATCTCTTCGAGACACTA ATGTTTCAGTATTATCCACAGATTCTGATGCCAGGCAGCCCAGA TGACTGGGGTCAGTTATTAGCATGCTTCCTGGAGGTGGTTCCCA GGT [A/G] CAGGCTACCTGCAGTCTGGCTGGATGGGCCCTGCAC CACACTTGCTTCTGGGAAGCTGGTTTTGGGGTTGCCACAATCTC TGAAAGAATCACTAGGCCACCCTCTGAGTGGGTCCTTCTGTAGG AATTATGGATAAAATTGTTCCACTAGTCTTACCTTCTTGGGGAA CCCTTCCTGGATTCCCAGGCTGGGCTGGGTGTCCCTGCAGCCTA GCCCCACAGCCCTCCTGCTTCTCTTTCTCATCACAGTCTTGTTA TCTCTACCAACTGTAGGCCTGCCCCACTGATGGTGTGAATAAAG GGACTGGGTCTCTCTAGCACCTAGCATAGATCTGATACATAGTG GGTGATCTCTATTGAATGAACGATGAATGAATGAATGAATGAAT ACATTTAGATAATTCAGATTACTCTTTCTAGCTCAGCAGTGTAA AGCAGGAAGACATGCTGTCAATATGATTTAGGGCAAGTTT	SEQ ID NO. 189
KCP_1751	AACGATGAATGAATGAATGAATGAATACATTTAGATAATTCAGA	SEQ ID

06	TTACTCTTTCTAGCTCAGCAGTGTAAAGCAGGAAGACATGCTGT CAATATGATTTAGGGCAAGTTTTCAAATCTCTCTGGACCTCAGT TTTACCTCTTGAAAAATAAATATAATAATTTGTCCTTACTTCAT GAGACTATTTTGAAGATTAAATGAGATAATGTATACACTACTAC TCACTGTCCTTACTTGAATATTCCTAGGTCCTTGGTGCTACATT AGGCTACATAGAATGTATTTAAAGTAATAGAGTGGTATTTAATA AATATTCATTTTCTTTCCCCAGAACTACCTTAAATTAATTTGTT GAAAGGACAGATGGATGGATGGTTGATGGAAGTAGCAGGCTTCC AGCAGCAGGGGATGGAGTGAGTGTGTGGATACCGCTGGATCAGC AGAAGGTTATACCATTTTAGAGTAACTATCTCGGACTTCGGAGA GTTCCTGGGTATGAAG [C/G] TTTGGCTTTAATTAAAGTCTCAG CACAGTGTTAAATGCCATTTTATTTTAGGTCATAATTAACACTA ATGAGATGAGTGGATTACAAAGAGCACACATTTTGAGAAAGTGA AAAACAACATCTGAGCTTGGTGGTTTCCATTTTCGCTTTTCCCC CTCCCATGCTCTGTTCAATTAAAAGTTTTGAGAAAATATTACAA CCATACTCCTTGTCTTTGTGGTAATGAAGCATATTAATTTGAAT GTGATGAATACAATATTCCACTGACTTTTTTATTCCCTTATCTA CAAAAGTTTAAAATAATGGACCAATTAAACCAGGAGAGAAGAAT GCAGGGTTTGCCTGGGGATCCAATTCAGCAACCAGAGAACTGAA AGAACAAAATTTTTTGACGGAGTCTGGGCCAGACTTCATCCCTT ACCTATAGCTGACAAACAGTAAGTCAAATTGGGCAGATGTGGAC CAGCGCAGAACACATACTATATTGAGGATCGAAAGGC	NO. 190
KCP_1751 70	GTGTAAAGCAGGAAGACATGCTGTCAATATGATTTAGGGCAAGT TTTCAAATCTCTCTGGACCTCAGTTTTACCTCTTGAAAAATAAA TATAATAATTTGTCCTTACTTCATGAGACTATTTTGAAGATTAA ATGAGATAATGTATACACTACTACTCACTGTCCTTACTTGAATA TTCCTAGGTCCTTGGTGCTACATTAGGCTACATAGAATGTATTT AAAGTAATAGAGTGGTATTTAATAAATATTCATTTTCTTTCCCC AGAACTACCTTAAATTAATTTGTTGAAAGGACAGATGGATGGAT GGTTGATGGAAGTAGCAGGCTTCCAGCAGCAGGGGATGGAGTGA GTGTGTGGATACCGCTGGATCAGCAGAAGGTTATACCATTTTAG AGTAACTATCTCGGACTTCGGAGAGTTCCTGGGTATGAAGGTTT GGCTTTAATTAAAGTCTCAGCACAGTGTTAAATGCCATTTTATT TTAGGTCATAATTAAC [A/G] CTAATGAGATGAGTGGATTACAA AGAGCACACATTTTGAGAAAGTGAAAAACAACATCTGAGCTTGG TGGTTTCCATTTTCGCTTTTCCCCCTCCCATGCTCTGTTCAATT AAAAGTTTTGAGAAAATATTACAACCATACTCCTTGTCTTTGTG GTAATGAAGCATATTAATTTGAATGTGATGAATACAATATTCCA CTGACTTTTTTATTCCCTTATCTACAAAAGTTTAAAATAATGGA CCAATTAAACCAGGAGAGAAGAATGCAGGGTTTGCCTGGGGATC CAATTCAGCAACCAGAGAACTGAAAGAACAAAATTTTTTGACGG AGTCTGGGCCAGACTTCATCCCTTACCTATAGCTGACAAACAGT AAGTCAAATTGGGCAGATGTGGACCAGCGCAGAACACATACTAT ATTGAGGATCGAAAGGCCAGGTTCCAGACCGTCCTCTAATATTT TCTTAGTGAATATTTGTTGGATGAATGCATGGATGGG	SEQ ID NO. 191
KCP_1752 52	CTTACTTCATGAGACTATTTTGAAGATTAAATGAGATAATGTAT ACACTACTACTCACTGTCCTTACTTGAATATTCCTAGGTCCTTG GTGCTACATTAGGCTACATAGAATGTATTTAAAGTAATAGAGTG GTATTTAATAAATATTCATTTTCTTTCCCCAGAACTACCTTAAA TTAATTTGTTGAAAGGACAGATGGATGGATGGTTGATGGAAGTA GCAGGCTTCCAGCAGCAGGGGATGGAGTGAGTGTGTGGATACCG CTGGATCAGCAGAAGGTTATACCATTTTAGAGTAACTATCTCGG ACTTCGGAGAGTTCCTGGGTATGAAGGTTTGGCTTTAATTAAAG TCTCAGCACAGTGTTAAATGCCATTTTATTTTAGGTCATAATTA ACACTAATGAGATGAGTGGATTACAAAGAGCACACATTTTGAGA AAGTGAAAAACAACATCTGAGCTTGGTGGTTTCCATTTTC [A/G] CTTTTCCCCCTCCCATGCTCTGTTCAATTAAAAGTTTTGAGAA	SEQ ID NO. 192

	AATATTACAACCATACTCCTTGTCTTTGTGGTAATGAAGCATAT TAATTTGAATGTGATGAATACAATATTCCACTGACTTTTTTATT CCCTTATCTACAAAAGTTTAAAATAATGGACCAATTAAACCAGG AGAGAAGAATGCAGGGTTTGCCTGGGGATCCAATTCAGCAACCA GAGAACTGAAAGAACAAAATTTTTTGACGGAGTCTGGGCCAGAC TTCATCCCTTACCTATAGCTGACAAACAGTAAGTCAAATTGGGC AGATGTGGACCAGCGCAGAACACATACTATATTGAGGATCGAAA GGCCAGGTTCCAGACCGTCCTCTAATATTTCTTAGTGAATATT TGTTGGATGAATGCATGGATGGGTGGATGAATAGATGGATGGAT GGACAGATGGACGGAGAGAGAGATGGATGAATGGATTGTTGG	
KCP_1768 36	GCAGGCCTGTGAACCTGACACATGGTCCAGGTGTCTCCCTGAGG ACTTCTGGAAGTCTCCCCACCTCTCTGTGGTCCTTTAGGCATTA ACACCACCTTGTCACTGTGTCTTCTGAGGCAGTCTGGAAGTTCA TACCCCACAATCTCTGTGTACCTTGTCCCCCATTCTGTTCTCTG CATTGCAGATGGTTTAAAACACACACACATACACGCGCAAAATG TTGTTCCTTTTCTTAAAACCCATTGTGGCCAGGCTAGACAAATC CTTAACACGGTCTACAATATTCTGCATGGCATGGCCCCTGGGTG CCTCCCAACCTGATCTGTCACACACCACCTCCACCTTTGCCTGT TCCCTGGGCCCTAGCACTAACCTTTGGTTCATTCCTAGACACCT TTTCAGCACTTAGGCCCCCACAGCCCTCAGAACCTTTACACTTG CTGTCTCTTTTGCTTTAA [A/G] TGTTCTTGCCCCACCTACCAC CTAGTTAATGCCTTTTCCTCCTTCAGCTCTTAGTTGAAGCATCA CTTCCTCAAGGAGGGCAGCCCTGATGAAACTCATTATGCAAACT CCAGCCTGGGTTGGGCCTTATCTTTATGCTGTCATGGCCCTGAG TATTCTTCCTTTATGGCACCAATCACGGCTTATATGATATACTT ATGCTATTATTTGAGTTATGTCTGTCTCCCCCAGTATGCCACTA GTATTAGAATCATTGATTTTTAATCATTGTATCCCTAGTGCTTA GCACAGAGCCTGGCTCATAATAGATGCTTAATAAATATTTGTTG AATAAATGAATGAGTGAATGAATAAATGCCTCATTCAAGAGCTT TGGCTCTTTCTGTACTACTACATTACTTCTATTTTTTAGCTCTT AATTCTCAAAGCACTTTCTTTGTGCTGGGCTTATGCTGGGAGCT TAGACAGTAAAGCTTAGA	SEQ ID NO. 193
KCP_1801 73	TTACATCCACAGGTTTGATTATAAATGTGTGTATTGAATTGGAA TTTCTGTTGAAATTCTGATCCCTTCTAGACAAAGAAGGTAAAAA TTGAAACATGTCAATGGATATCTAAATATCATTACTCACTGGCT TTATTTGCAAATGGCTTTCCATTGACAACAGTTACATTTTGTTC AAAGCAACAAATGATTGGCGCTGACAATCCACAGGAACATGGTG CAGTCATTAATGAATGTGCTCATTATTCCTCCCTGCCGGGAGGC ATCGACTCCCGTTCTCCAGCCTGTTTTAAGCAGACAGACCTACA TCTGCACCTGTCAGCTTGGAACCCTAGTAGGGGAGGGGGATGCT GATGTGATGGAGAATGAAGAATGGGCCCTGCAGGCTGACATTTT GGGAGAGTAGGTTCTGAAATTTATCCCAAAGGACATGGAATCCT GGAAGCAGGGTTCAAGATCCTCCCAAAATTGATCTCCCAGGATG CTTGGAATGATTGTTC [C/T] GAGGGTTTTGTAAAATGCCAGGG GAAAACCAGGAAGCTTCTCTCCAGTTGTCTTGCCTCCTTCCTCT CCAGTCTCCATGGAGCTGACTTTGAGAATTAACTCCTGAGGGAC AGAGACCCTGGGATGGAGAGCCAGCCCTGCTGGATTCCACAAGG TGCTGCTTAAAGCACAACACCTCTTCCCAATGACAGGTTCTGAA AGAAGGCCTTGTAGCTAGATGCACAGAGGGTTTTGTTTTGTTTT TTTTTTTTTAACCTTTCAGCATCTGTCTAAAATTGCTCTGGGCT GGGTACAGTGGCTCCCACCTGTAATCCCAACACTTTGAGAGCTG AGGCAGGAGGATCGCTTGAGCCCAGGCGTTCTAGACCAGCCTGG GCAATATAGTGAGATCTCTATGTCTAGAATGTTTTTTAATTAGC TGGGCTTGCTGCCTGCACCTGTAATTCCAGCTACTTGGGAGGCT AAGGTGGGGGGATCACTCGAGCCCAGGGGGCTGAGGC	SEQ ID NO. 194
KCP_1802 37	CCTTCTAGACAAAGAAGGTAAAAATTGAAACATGTCAATGGATA TCTAAATATCATTACTCACTGGCTTTATTTGCAAATGGCTTTCC	SEQ ID NO. 195

	ATTGACAACAGTTACATTTTGTTCAAAGCAACAAATGATTGGCG CTGACAATCCACAGGAACATGGTGCAGTCATTAATGAATGTGCT CATTATTCCTCCCTGCCGGGAGGCATCGACTCCCGTTCTCCAGC CTGTTTTAAGCAGACAGACCTACATCTGCACCTGTCAGCTTGGA ACCCTAGTAGGGGAGGGGGATGCTGATGTGATGGAGAATGAAGA ATGGGCCCTGCAGGCTGACATTTTGGGAGAGTAGGTTCTGAAAT TTATCCCAAAGGACATGGAATCCTGGAAGCAGGGTTCAAGATCC TCCCAAAATTGATCTCCCAGGATGCTTGGAATGATTGTTCCGAG GGTTTTGTAAAATGCCAGGGGAAAACCAGGAAGCTTCTCTCCAG TTGTCTTGCCTCCTTC [C/G] TCTCCAGTCTCCATGGAGCTGAC TTTGAGAATTAACTCCTGAGGGACAGAGACCCTGGGATGGAGAG CCAGCCCTGCTGGATTCCACAAGGTGCTGCTTAAAGCACAACAC CTCTTCCCAATGACAGGTTCTGAAAGAAGGCCTTGTAGCTAGAT GCACAGAGGGTTTTGTTTTGTTTTTTTTTTTTTAACCTTTCAGC ATCTGTCTAAAATTGCTCTGGGCTGGGTACAGTGGCTCCCACCT GTAATCCCAACACTTTGAGAGCTGAGGCAGGAGGATCGCTTGAG CCCAGGCGTTCTAGACCAGCCTGGGCAATATAGTGAGATCTCTA TGTCTAGAATGTTTTTTAATTAGCTGGGCTTGCTGCCTGCACCT GTAATTCCAGCTACTTGGGAGGCTAAGGTGGGGGGATCACTCGA GCCCAGGGGGCTGAGGCTGCAGTGAACCATGATTACACCACTGA ACTCCAGCCTGGGCAACAGAGTGAGACCCTGTCTCAA	
KCP_1840 80	CTGATGGAACTGGGATGTGAGAAGAAGGCAGGTTTTCTGATAAA CAATTCCTGTATCTTTCACAAATGCCAAATCACAGACTCAGCTT GGGACATATGAGGACAGCACAGACTTTGGAGGCAGGTAGATTTT GGGTTGTCACGCAGACACCCACTACTATGAGACCTGGATTTCCT TCTGACGTTATTGGGGATAAGAAGTGGCACCTCACCATTTCTAG GAAATAGTAGGTAAGTCTTTCTGGTTGCCACTGAGGTGACTCAC CTGAGACACAGTTGCTCCTAAAGTTCAAGGTTAGGAGACAATCC AGAAGGGGAGCTGTCTGTGAAGTCAGAATTCTTGGAAGAATGTA AGTCTTTACACAGTAACAGCAAAGCAGACAGTGGGAACCACTAC TCTGCCTTCTTGCATCATTCTTTCCTAGAAATACCAGAAAGCAG TGAGGGATTAAGTCTAATTCCTGGCACCTGACCTTATATCTAAC AGATGCTCAGTATTAC [C/G] TGTTGATGGGACCTCACTGGGAA TGTTTTGTGTGCAGTACAAAAGGGCAATAGATGAAACTTTGGGA CGGGAGCCCAGGAAAATGGCTGAGAGGAGAGCTTATGCCTAGCT TATGCATGAGCTTGCAAAAAGGGAGAATACACGGGAGGGAAGAT CAGCAACAGCATGAGTTTTATAAGGCAGAGAGTTGTTGGGAAGG AAGCAGCAGGGAGAGGGGAAGGAGTAAGTAGAAACCTAGAAGAG ATACAGCTAAGATAAGCCAAGAGAACAAAGTATTGACTTACCAG AAACATGGAAGTCTTCCTGCTTCTAATTTAGTTCCGCATATCTG GATATGTGAATGCCTAAAATCCCATTAAGCCCAGTGGGTTAATT ATTACACTTGCTAGGGCCCCAGAGGAGAGGAAACACAGTAAGTC AGAAAAACCTCTGGGCAGGTGAATTTCTCAGGTTTTCTTCTGGG CAGATGGGATCTGGAATGGTAGCGTGGCATCCTGGTA	SEQ ID NO. 196
KCP_1855 79	CCTTTCCAATATTAAAATAATATTAACATTGGTAATAGTGGTAC TAAACAACTTAGGGTGTTTTTTTTTTCATTTAATAGTATATTTT TAGTATCTTTCCAGGAAAAGATACATGGATGTGCCACATTATTT TTAATGGCTCACATGGTACTCCTTTTATGTATGCACTATAATTT ATGGAACCAGTTTTCTCACCGATGAGCATGTAAGTTCTTTCAGT CTTTTACTGTTATAAACGAATGATGCAATGAATATCCTTGTACA TATATATTTGTGCGCATATGTAGGTATCCTTACAAGTGGAATTT CTGAATAAATGGATATATACAATTTATTTATGAATTTACCTTCC TACAAGTGATTCAAGAGAGTGTCTTTGCTCCACAGTGTTGTCAA TATAGTGTATTCTCAAAATCTGACACCAATATGTGTGAAGTGCC TGCTCTGTTCCCACACTTTACACAGGTTCTCTTATTTG [C/A] G TTAAGTTTATTTAAGAAGAGGAAACTGGGCCTCATGGAGATCTA GGAACTTGCCCAAGGACAGGTCTCTGTGACTCTAAGAGTGCAAT	SEQ ID NO. 197

	CTTCCCTTTTCCCCATGTCAAGCACCTTTCCCCACCAGGCTCAC TGCTGACAATCCAGTGTACGAAGAAGGGAAATTACCCCCACAGA GCCCAAAAGTTTAGGACATGCCGACAGCATCACTCTTTTGCCTC CTCATTCTCTCTTTCATTTCCAGAACATTTGCTCACTCAGTGCT GCCCAGTGATACTTAGCCAGCCTGATTACCCATCTAATAATTTC TGATACTAATATAAAACCTTCCCAAAGACAAATATAACTGAGAC GCACTCCAGCTTACCATAGCTTTCCTGGTGGTACAGTTTCCAGG GACATTTCACTGTGTCAAAGCAGGGACCACATATGTTCCAGACC AGCTTGTTGGGTTTTTCACTGGGAAGTGAAGACAAATTGTTGTC CCTT	
KCP_1860 48	TTCCCACACTTTACACAGGTTCTCTTATTTGCGTTAAGTTTATT TAAGAAGAGGAAACTGGGCCTCATGGAGATCTAGGAACTTGCCC AAGGACAGGTCTCTGTGACTCTAAGAGTGCAATCTTCCCTTTTC CCCATGTCAAGCACCTTTCCCCACCAGGCTCACTGCTGACAATC CAGTGTACGAAGAAGGGAAATTACCCCCACAGAGCCCAAAAGTT TAGGACATGCCGACAGCATCACTCTTTTGCCTCCTCATTCTCTC TTTCATTTCCAGAACATTTGCTCACTCAGTGCTGCCCAGTGATA CTTAGCCAGCCTGATTACCCATCTAATAATTTCTGATACTAATA TAAAACCTTCCCAAAGACAAATATAACTGAGACGCACTCCAGCT TACCATAGCTTTCCTGGTGGTACAGTTTCCAGGGACATTTCACT GTGTCAAAGCAGGGACCACATATGTTCCAGACCAGCTTGTTGGG TTTTTCACTGGGAAGT [A/G] AAGACAAATTGTTGTCCCTTTGA AAAAGCATCTTTCATCTCTCCATCTATCTGCGATCTAAAGCAAT GGGGCTCTTTCTGTATGTCTTTCAAATGGTCTACACTGACACAC GTTTTCTCTGAGCTGCCGAGAGAATATGCCATGAGATGTTGCCA GTGATGGTTACACTCAGCTAGCAGAAGATTAGGGACTGGTTAAA CCTTTGGAGAAATTGCCTTGGGAAAAGAGGAAATAAAAGCAAAT ATTACTATGAAACATAGAGATTACCAGGTAGGAGGAGGAGAGAG GTGGAGGGAGGGGTAGGAGTGGAAGGAAGGGAGGGAGGCAGAAA GAGGAAGGCAGACTGGTGGAAAATAAACCGTGCACTTTAGAACA GCAGGAAGGGAGGCTTGGAAGCCTGGTTTTCTGGCTTTGAATGA CCGCCTAGCGCTTGCCGGTGCGCCAGGGTGCTGTGAGGATGTGG GCAGAGGGCGAGTCCGAAGGGCTCCAGACACTGGGAA	SEQ ID NO. 198
KCP_1866 79	GAGAATATGCCATGAGATGTTGCCAGTGATGGTTACACTCAGCT AGCAGAAGATTAGGGACTGGTTAAACCTTTGGAGAAATTGCCTT GGGAAAAGAGGAAATAAAAGCAAATATTACTATGAAACATAGAG ATTACCAGGTAGGAGGAGGAGAGAGGTGGAGGGAGGGGTAGGAG TGGAAGGAAGGGAGGGAGGCAGAAAGAGGAAGGCAGACTGGTGG AAAATAAACCGTGCACTTTAGAACAGCAGGAAGGGAGGCTTGGA AGCCTGGTTTTCTGGCTTTGAATGACCGCCTAGCGCTTGCCGGT GCGCCAGGGTGCTGTGAGGATGTGGGCAGAGGGCGAGTCCGAAG GGCTCCAGACACTGGGAATAGTGGTGGTCGTGTGCTCCTCCCTG AAACTTTTGCACTACCTCGGACTGATTGACTTGTCAGACGGTAA GCGAACCCTGGAGCTTCCCCGTTTTCTGTGAATGTGTTTTTGTG GCTTCGGTTGCTGTGA [C/G] AGTCGTTTCGAAAATGCACGGAA ATGAGGGCGGAGACCCGAGAGATTTGAAAAAGCCGGGCTGAAAC AGCGTGGTATTGGTCCCCGCCTCCCCAGTCGCGCCCCAGTGCTG CGCTGTCCGTCGTGCTGAAATGTGGTGCGCCTGGGGAGTGCGGG AGCCAGGAAGTTAGGGTCTCCTGCTCCGGCCCTATGAGCATGTG AGTCTTGATGGATTATTAGCTATGGGTGAGGCCAGCACAACACA TCACAATTCTCTCTGAAGCTGTCTGGTAACTACGTATATTGTTG ATGGAAGCCAGTGACTTTTAAAAGCCATTATGTTGATTAACTTT TTTAAAGAAGTTTAGGAGATTATATGGAGGTAAAAACCTTTGTA AAATGCTAATCACAGTGTCTGACAATTAGAACACATTTAATAAA TGTCAGTTTCTTTGCTCAACCCTTATAAGAACCCTTATTCCAAA GCCACCTCCTCAGCTCTGACTTCAGCTCCATTCCTTA	SEQ ID NO. 199
KCP_1871	TGCTGTGACAGTCGTTTCGAAAATGCACGGAAATGAGGGCGGAG	SEQ ID

16	ACCCGAGAGATTTGAAAAAGCCGGGCTGAAACAGCGTGGTATTG GTCCCCGCCTCCCCAGTCGCGCCCCAGTGCTGCGCTGTCCGTCG TGCTGAAATGTGGTGCGCCTGGGGAGTGCGGGAGCCAGGAAGTT AGGGTCTCCTGCTCCGGCCCTATGAGCATGTGAGTCTTGATGGA TTATTAGCTATGGGTGAGGCCAGCACAACACATCACAATTCTCT CTGAAGCTGTCTGGTAACTACGTATATTGTTGATGGAAGCCAGT GACTTTTAAAAGCCATTATGTTGATTAACTTTTTTAAAGAAGTT TAGGAGATTATATGGAGGTAAAAACCTTTGTAAAATGCTAATCA CAGTGTCTGACAATTAGAACACATTTAATAAATGTCAGTTTCTT TGCTC [A/G] ACCCTTATAAGAACCCTTATTCCAAAGCCACCTC CTCAGCTCTGACTTCAGCTCCATTCCTTAGTGAGAATGGGGTTA TAAATCCAGGTTAACCCGATTGTTTAGGATTAGAAAGTGATTTG GTTTCCAACGTTGAAGGAGTTCAAGAAACAAAGAGTTTTATTTT TCCTCCTTATGAGATATTGTTCCAAATAGAACACAGTTTGTCTA GATGATTTTTGTCACTTAAAATTAGGCTCCAGGAAAGATTCCAA ATTTCATGAGCAATTGGGCTCATAAAACAAGATCAAACTCCAAT AGTGTATATCCAAAGTATGTATAATGTGTATTCGGTGTATATTC TTCCACCACTGCATGGTGTAGACAGAATTTCTCTTCCAAGGGGC ACCACATGACAAAACCGTACATAATAATGAAATGCATTTGTAGA CAAAGGACTAGCTAAAATACCAACTGAAAGTGGGAAGACCAGAA ACTGAAG	NO. 200
KCP_1872 58	AATTGCCTTGGGAAAAGAGGAAATAAAAGCAAATATTACTATGA AACATAGAGATTACCAGGTAGGAGGAGGAGAGAGGTGGAGGGAG GGGTAGGAGTGGAAGGAAGGGAGGGAGGCAGAAAGAGGAAGGCA GACTGGTGGAAAATAAACCGTGCACTTTAGAACAGCAGGAAGGG AGGCTTGGAAGCCTGGTTTTCTGGCTTTGAATGACCGCCTAGCG CTTGCCGGTGCGCCAGGGTGCTGTGAGGATGTGGGCAGAGGGCG AGTCCGAAGGGCTCCAGACACTGGGAATAGTGGTGGTCGTGTGC TCCTCCCTGAAACTTTTGCACTACCTCGGACTGATTGACTTGTC AGACGGTAAGCGAACCCTGGAGCTTCCCCGTTTTCTGTGAATGT GTTTTTGTGGCTTCGGTTGCTGTGACAGTCGTTTCGAAAATGCA CGGAAATGAGGGCGGAGACCCGAGAGATTTGAAAAAGCCGGGCT GAAACAGCGTGGTATTGGTCCCCGCCTCCCCAGTCGCGCCCCAG TGCTGCGCTGTCCGTCGTGCTGAAATGTGGTGCGCCTGGGGAGT GCGGGAGCCAGGAAGTTAGGGTCTCCTGCTCCGGCCCTATGAGC ATGTGAGTCTTGATGGATTATTAGCTATGGGTGAGGCCAGCACA ACACATCACAATTCTCTCTGAAGCTGTCTGGTAACTACGTATAT TGTTGATGGAAGCCAGTGACTTTTAAAAGCCATTATGTTGATTA ACTTTTTTAAAGAAGTTTAGGAGATTATATGGAGGTAAAAACCT TTGTAAAATGCTAATCACAGTGTCTGACAATTAGAACACATTTA ATAAATGTCAGTTTCTTTGCTCAACCCTTATAAGAACCCTTATT CCAAAGCCACCTCCTCAGCTCTGACTTCAGCTCCATTCCTTAGT GAGAATGGGGTTATAAATCCAGGTTAACCCGATTGTTTAGGATT AGAAAGTGATTTGGTTTCCAACGTTGAAGGAG [G/T] TCAAGAA ACAAAGAGTTTTATTTTTCCTCCTTATGAGATATTGTTCCAAAT AGAACACAGTTTGTCTAGATGATTTTTGTCACTTAAAATTAGGC TCCAGGAAAGATTCCAAATTTCATGAGCAATTGGGCTCATAAAA CAAGATCAAACTCCAATAGTGTATATCCAAAGTATGTATAATGT GTATTCGGTGTATATTCTTCCACCACTGCATGGTGTAGACAGAA TTTCTCTTCCAAGGGGCACCACATGACAAAACCGTACATAATAA TGAAATGCATTTGTAGACAAAGGACTAGCTAAAATACCAACTGA AAGTGGGAAGACCAGAAACTGAAGTGTAAGATGAGGTAAGCCCT GGAGTAAGAGTCAAGAAATCCACTTTCTATCCATAATCTGTCTC GGTTTAATGTTGGTCAAGTCATTTTTTAAAAAATTCTAGGTCTT GGTTTCCTTATGATGACTTTAGATCTCTGTTCCTTGGAATTCTA GAGTGATCCAAAGGTTTCTTTGAATTCAGTTTTGTGGGTTGAGA CGGGCAGCCAGACTGTGAGTCCCTCAGCTCTGCTTCAACCAGAA	SEQ ID NO. 201

	CAGCTCCACTTTACTGTTCAGCATGTTAGCCCTGTATGTAAGGA TGTTTTTTAGCTTTAGCTAAAATTTAGTGACTCTATGACCCTAA GGCCCTGCTTCCCTGAGATTTTGAAAGCTGAAGCACATTCGGAA AACTTTTTCTTCCTTAAAAATCACCTGAAATCTGACAATCTGGA AGACTAGTTCTGTCTGCTCCAGCCCTTGGTCCCTTAGATGTGCT TTTCTGAAGATCCAAACTCAACCTGCCAGTCAATATACCAACTG AGCAGAGCCCCTGTTCTCCACCAGATTTCAAGAGAACATGTTCC ATTCCTGTTCAGAGCTTCAGAGCAGCTTCCGCTAAGATTGCACA TTAATGCAACAGCGTCCTATTTTCTTTGTTTCTTTTTTTTTTTT TTTTTTTTTTTTTGATGAGACAGGG	
KCP_187688	ATTTTTCCTCCTTATGAGATATTGTTCCAAATAGAACACAGTTT GTCTAGATGATTTTTGTCACTTAAAATTAGGCTCCAGGAAAGAT TCCAAATTTCATGAGCAATTGGGCTCATAAAACAAGATCAAACT CCAATAGTGTATATCCAAAGTATGTATAATGTGTATTCGGTGTA TATTCTTCCACCACTGCATGGTGTAGACAGAATTTCTCTTCCAA GGGGCACCACATGACAAAACCGTACATAATAATGAAATGCATTT GTAGACAAAGGACTAGCTAAAATACCAACTGAAAGTGGGAAGAC CAGAAACTGAAGTGTAAGATGAGGTAAGCCCTGGAGTAAGAGTC AAGAAATCCACTTTCTATCCATAATCTGTCTCGGTTTAATGTTG GTCAAGTCATTTTT [T/A] AAAAAATTCTAGGTCTTGGTTTCCT TATGATGACTTTAGATCTCTGTTCCTTGGAATTCTAGAGTGATC CAAAGGTTTCTTTGAATTCAGTTTTGTGGGTTGAGACGGGCAGC CAGACTGTGAGTCCCTCAGCTCTGCTTCAACCAGAACAGCTCCA CTTTACTGTTCAGCATGTTAGCCCTGTATGTAAGGATGTTTTTT AGCTTTAGCTAAAATTTAGTGACTCTATGACCCTAAGGCCCTGC TTCCCTGAGATTTTGAAAGCTGAAGCACATTCGGAAAACTTTTT CTTCCTTAAAAATCACCTGAAATCTGACAATCTGGAAGACTAGT TCTGTCTGCTCCAGCCCTTGGTCCCTTAGATGTGCTTTTCTGAA GATCCAAACTCAACCTGCCAGTCAATATACCAACTGAGCAGAGC CCCTGTTCTCCACCAGATTTCAAGAGAACATGTTCCATTCCTGT TCAGAGCTTCAGAGCAGC	SEQ ID NO. 202
KCP_189331	CTCTAAAATTTCACCCTCTGTTCTGTACACCAAGTACCTCAGCA AGTAATCCAGTTCCAGATGGGATCTGCAGTCTGCCATTAAGTCT TTACCACACATAGGCTCTTATGCTAGAGCCCTTACCATATGGTC CAAAATGCCATTTTTAATGTGTATTTGATATGGAGACTCTGTTC ACAATTTGAGTACTAAAGAGAGAATACCACCTCCTAGTAGATAC ACCAGGACCAATGTAATGCTGTCATTCTAAGGAGAGCAGTGGAA CATCTCCAAAGAACCCATCTGTAGTCTTCCTTCGGCCCTTGATC TTATTCCTATTTTATTTTTAAGGTTTTTTTTTTTTTCTTCGAGA CTAAATCTCACTCTATCACCCAAGCTGGAGTGCAGTGGCATGAT ATCAGTTCATTGCAACCTCTGCCTCCCGGACTCAAGCGATTCTC CTCACTCAGCATCCCAAGTATCTGGGACTACAGGCATACACCAC TATGCCCAGCTAGTGT [A/G] TGTGTGTGTGTGTGTGTGTGTGT GTGTGTGTGTGTGTGTGTTAGTAGAGACAGGGTTTCACCATGTT GCCCAGGGTGGTCTTGAACTCCAGAGCTCAGGCGATCCACCTGC CGAGGCCTCCCAAAGTGCTGGGATTACAGGCATGAGCCACAGCG CCTGGCCAATCTTTTAGGGATAATTTTAGAACAGTATACAGATA TTGAGCCAAGAGTCAAAAGAGCTGGGTTGCAATTCTGGTTGTGC CATTTATCAGTTGTGTGAGGTGGGACAAGTCTCTTTTTCTCCCT AGCTTTCTCTTTCCTCATTTATAAAATAAAGAAATGAGAATGAT AGTTGTATTAATTTCTGAGGACTGCCAGAACAAATTACTACAAA CTGGGTGGCTTAAAACAACAAACATTTATTCTCACATAGTTCAG GAGGCTAGCAGTTTGAAATCAAGTTCTTGACAAACTCCCCTAGA GTCTAAAGTCTCTAGAGAAGGATTCCTCCTTGCCTCT	SEQ ID NO. 203
KCP_192742	GAGCAAGCACTGCAGCCATCCTCCTTTATTTCCCTCAAGGCAAT ATCCAAGGATTAAAAAGTCAGAGCCGTCTGCAGATTCCTCCTCT CTACCTTGCCCTGCACTTTTTGTGCCCTTCCTCTTCCCCCTCTC	SEQ ID NO. 204

	CAGCCCCAAACCTCTCTCCTGATCCACGGTACTCCTCCTGGGAT GTCCACTGGGGCTGATCCTCCCCCATTCTCCCCCTGAGTTCCCT GCTGTTAATCTGTCTCCAGCAAAATTAACCTAGCCTATGTCCCA TGCCCTCTGGACTCTGGCTGCTCGTCAATCACTCTTAAAAATCC GGTTTCTCCTTAGGCAATCATTTTGTTTTGATTTTATGTGTAAA AAAACCTGAGTAAATTTTTTTTTTTTTTGAGATGGAGTCTTGCT CTGTTGCTCAGGCTAGAGTACAGTGGCATGATTTCTGCTCACTG CAACCTCCGCCTCCCGGGTTCAAGCGATTCTCCTGCCTCAGCCT C[T/C]TGAGTAGCTGGGACTACAGGTGCCCACCACCATGCCTG GCTAATTTTTGTATTTTTGGTAGAGACAGGGTTTCATCATACTG GCCAGGCTGGTCTCAAACTCCTGACCTTGTGATCCACGCACTTC GGCCTCCCAAAGTAATCACTGCTGGGATTACAGAAGTGAGCCAC CGTGCCTGGCCAAACCTAAGTAAATGTTTTAAAATTATACTACT AACATAGCATACAGGCTTTAGACTGTTGGTTGCTTTTAAGTTTG CTTACTTTAAAAGCTAGAGAGAAGATGGTTGAGGTGATCTTGTC TCCTTCAGTATTCACTCTGAGCCATGCCTCCTGAGGAAGTTTGC TTTAGGGGAGGCATTGCTATGTTATACACTCTACGATGCACCAG CCCTTGCCTCAGAAGGCAAGGTTTGAACCCCAACACTGTCTTTT GCAAACTGTTACCTTAGGAAATAGATTTTATCTCCTTAACTCAC TTTTTA	
KCP_193193	GTTCAAGCGATTCTCCTGCCTCAGCCTCTTGAGTAGCTGGGACT ACAGGTGCCCACCACCATGCCTGGCTAATTTTTGTATTTTTGGT AGAGACAGGGTTTCATCATACTGGCCAGGCTGGTCTCAAACTCC TGACCTTGTGATCCACGCACTTCGGCCTCCCAAAGTAATCACTG CTGGGATTACAGAAGTGAGCCACCGTGCCTGGCCAAACCTAAGT AAATGTTTTAAAATTATACTACTAACATAGCATACAGGCTTTAG ACTGTTGGTTGCTTTTAAGTTTGCTTACTTTAAAAGCTAGAGAG AAGATGGTTGAGGTGATCTTGTCTCCTTCAGTATTCACTCTGAG CCATGCCTCCTGAGGAAGTTTGCTTTAGGGGAGGCATTGCTATG TTATACACTCTACGATGCACCAGCCCTTGCCTCAGAAGGCAAGG TTTGAACCCCAACACTGTCTTTTGCAAACTGTTACCTTA[G/A] GAAATAGATTTTATCTCCTTAACTCACTTTTTACATTTGCAAAA TGGGTAAATTGTGACTACCTCACATGGATGTCATGAGATGAAAT GTAAGAATGTGTGTCCCTGGCATATAGTAACCACTTTCGCCAAA GACTGAGTTATCCAACTACAGACAGAGAACAGCTGGTGGCCTAA TCAAAGGGAGATACAAAATAACAATGCCAAGACTGGAAAAGGAA GTTCATCTTAGGATTTCCAAGAGAAAAAGAAATATGACTGTATT ATAATAGGTATATTTATTAAGCTCTTACCATGTGCCAAGCAAAG TTCTTTATATACATGATATACTTCATATACATTATTTCATTTAG TCCTCATGGCTACCAGGTGAGCACCATTATTTTCCCATTTTACA GATGAGGCACAGAGAAGTTAAGCCACTTACCTAGGAAGGGCAGT CCTAGTTAAGAAGCTGGGATTCAAATCCAAGAGGCTGGATTCCA GACCTCAGG	SEQ ID NO. 205
KCP_193956	TTATAATAGGTATATTTATTAAGCTCTTACCATGTGCCAAGCAA AGTTCTTTATATACATGATATACTTCATATACATTATTTCATTT AGTCCTCATGGCTACCAGGTGAGCACCATTATTTTCCCATTTTA CAGATGAGGCACAGAGAAGTTAAGCCACTTACCTAGGAAGGGCA GTCCTAGTTAAGAAGCTGGGATTCAAATCCAAGAGGCTGGATTC CAGACCTCAGGCTCTATTATGAGAAGTACCTAAATAGAGATTGG TTTAACCAAAGCCTGAGTCCCAACTAAGGGCAAGACTGTGACAC AGAGGTCACTAATCAGAATGAAAGATTGAGCCAGAGTTGAGTTG TTGGAATGTATTTTGGTACATTTAGGTTGTTTTAAGTATATCAA TCTCCATTCCACTCAATGGTTGAGTTCAGTTTCAAGTTTTCCAA ATGCTTTATGGGAAAGTCATATTTTTCTCCCATTGCAGCAGGGA TGCCAGCGCAGCCATG[C/T]TTCTCAACCACCAAGTAGAAGCA AAGCCAAACTGACCCAAGAAGATGAACAGAGGGAATCCAGGGAG TTCCAACTTGGGTTCACAGCTGCAATTCTCAAAGGATGGACTAA	SEQ ID NO. 206

	GCCATGTCACCCCTCCAGATAACACAGTCATATTAATAGTGACC TTTTGGAGGCCTCCCTAAACAGCAGGTGAAGTCCCAAAATCATT AGATTATTCCTGGCCTCAATTGTGGCCCAGAGGGAGAGCCCTAA GATTTTTCCATGGGAACAAAGATCTAAATTCTGGGACTATCTGG GCCATGTCCACCCTGCACCATTTACTACAAAATGGGCTGATCCT ATGGAAGCACACTACCTGTGTTGTGGTCATATAGATCATCACCT GGCTTCTCCAGGGCTAACCAGTTAGCATGGAAATGGGACACCCA AGAACAAGAGGATAGAAAGAAGGGAAGGGTGGAAAGAAGGAAGG AAGAAAGGGTGGGAGGGAGGGAAGAGTGGTAGTTTTG	
KCP_1946 16	TCCTGGCCTCAATTGTGGCCCAGAGGGAGAGCCCTAAGATTTTT CCATGGGAACAAAGATCTAAATTCTGGGACTATCTGGGCCATGT CCACCCTGCACCATTTACTACAAAATGGGCTGATCCTATGGAAG CACACTACCTGTGTTGTGGTCATATAGATCATCACCTGGCTTCT CCAGGGCTAACCAGTTAGCATGGAAATGGGACACCCAAGAACAA GAGGATAGAAAGAAGGGAAGGGTGGAAAGAAGGAAGGAAGAAAG GGTGGGAGGGAGGGAAGAGTGGTAGTTTTGGAAGGAAGGAGGGA ATCAGAGCTAAAGATAATACATGATATGAGTCAGTGTTCAATGT CCCTGAAGATTAGGGGAATCAAGCTTTGCTTCCAGGAGAATTAA CACAGGAGAGCCAACAGAGATGTGGAAATTTAGGAAGTCAGAGG AGACATTCTTTCA [T/C] TCATTCATTCGTTCATTCATTCACTT GCTCATTTTTACATGAATTGACTCTAGAACAGATGCTGGAGATA CAAAGATGCATGAGACTTGCCCCCATCCTCAACAGTCATTCACA GTCTAATCAGAAAGAGAGCCTTGCATTTGGAATACAATATGGAG TAATAATACCTCTGTGTTCAGCCTGCACAAAATACTCTGTATGC ATGGTCATATGTCCCTTGAAACAACTTTATGAGGAAGATACTAC TATAGTCTCCATTTGACAGATAAGGAAACTGAGGCTTAGGGAGG TCAAATAACTTGCCCAAGTAAAACAACTAGTAAGTAGCTGAACC ACAAAACAGAGATTCATGCAGAAAGCTGTACAACAGAAGAAACC AGGACTACATCTGCCTCAAAGGAACCAGAGAAGGCTTCCAAAGA AGGCAGCATTTTAAATGGGTTTTGAAGGATGTATAGCA	SEQ ID NO. 207
KCP_1965 48	CCCAGCCCTCAGGCACATCAGTGCCCTCTCTAGGCTCTCTCTCA CCAACTTTAGAATTGAATTACATCAGTTGTTTCCAGATGGTGAT CTGCAGAATTCCTTTAAAGACCACCTGTGGGATTTGAGGGAGGA AAACTACACTCTCCCAATCTCCCTCTTTAACCCAAGCATCTGAT TGCTTTCATCTGTTTTACATACTTAGCTTCTGTGCACAACTTCC TTTGATTAAAGAGTTCCTTGCCTTTATAGTAGTGGATGATATCT AAGGATGATGTAAAATACTGGGTGTTAGCTAAGGTTTTACCAAA CTTAAAGCCTTTATGCTTCATAATTCCACTTTATTGATGTAGGA AGACAAATGATAGACTTACTTTCAAGGTGGATAGAAGGGATGCG ACCTAGCCAAGGCTACAGCATTTCTCT [A/G] TGGCACCACTGC CATGACAACCATCAGTTTGAATGCCTTATGGGTGCATCCTATGG GTTATGCACTGGCCCCAAGCCATAACCCCTAGGACTCTAGAGCC AGCAGCAAACACAAAACACTGAATTAATAATGAGTGAGATCTCT GTTCCCATAGCTGCCACAGGCTAAATAAGTTGAGGGGGTATTGT AAAACCCAAGATGAGATCACTGAGCCTCTGGTATCAAAAAGGTG TATTTCACAGAATGTTTAGTTGGACGAGAGCTTGAAGAGCATGG AAACGATCTGGTATCATTCTGGTCAAAGACCAGAATTTAGACCC CAGTTCTGCCATTTGCTGACTAATGACTTTGGGCAAAATACTTA ACTTTCCTGAGAGTTAGTTTCCTCATCTATAAAGTGGGGTAATA TAACCCACCTTGCAGGATACTGGTAGGATTA	SEQ ID NO. 208
KCP_1976 78	AGCAGGGTCCCCTGAGCGTTCCTCCTCAGCTCCCAACACTTCCC TCCAGGCACCAGTATGCAGGGCAAGGTCCTGGAGGGGGCGCCGA AACACCACTCGAGATCCTCACTCTCAGGAATTCAATATAGAAAA CACATTAAGACCTGTTTACATGGAACTGCTGTTTATAATTATTG TTCCCTATGGGATATTCCCCACTGCTTCCTCCAATCCTCTTTTA AACTGCTCAACTAATAGAGTTTTCCTGGCTTCCCCAGGGAGACA TTCACAGATGCTAATAGAGACATAATTCAAAAATTGCTTGATAT	SEQ ID NO. 209

	ACATGCCCTCAATTTTCCCCAAGAACCACCTAAGTAAAGAGCCC CAGACATGCAACACATTCATTGGCCAGATGCAATTTAACATGCG TGGGATTAAATATACAGGCTACTACAGCCAGGTTGTCATCAAGC AGCAGCAGGCATGGCATTTTATCCTAAGGTACCACCA[T/C]GG CCAAATGCAACAGGAAAGAAGCAGGCTGCTGGGTGGACCCCTG GAAGATCCCCTCCTCTGTAATTTCCACTGCAAGCTTTTCCCAGG CCTTTTCAGGCAAAGCGGGGAGTTTTGAAAATAAATCCCCCAGG CTTGGAGAAGCAAAGAATCAATGCTAAGCAGCTCCGGAAATAAT AGCTTCCATCTCTCTGATATATAAAGAGGATAAGGAAGGCAGAA AGAAGGGGCATGATATTATGAGATTGCAACAATACATTGCAACA TTACATTAAAGAATTACAGAAAGCAAGATCTAGCTTCAGATGCC AGTTCATGCACTTACTCCCTGTGTGACCCTGGGAATCACTTAAG CTGTCTGAGACTTAGCTTGTCTAATGACAAACTGGGGATACTAA TATCACCTCCCAGGATTGTTGGGAAGGTAAATGGAGATTGACAA ATGTGAACACACTTAGTATGTCTTT	
KCP_1977 75	TGTTTACATGGAACTGCTGTTTATAATTATTGTTCCCTATGGGA TATTCCCCACTGCTTCCTCCAATCCTCTTTTAAACTGCTCAACT AATAGAGTTTTCCTGGCTTCCCCAGGGAGACATTCACAGATGCT AATAGAGACATAATTCAAAAATTGCTTGATATACATGCCCTCAA TTTTCCCCAAGAACCACCTAAGTAAAGAGCCCCAGACATGCAAC ACATTCATTGGCCAGATGCAATTTAACATGCGTGGGATTAAATA TACAGGCTACTACAGCCAGGTTGTCATCAAGCAGCAGCAGGCAT GGCATTTTATCCTAAGGTACCACCACGGCCAAATGCAACAGGAA AGAAGCAGGCTGCTGGGTGGACCCCTGGAAGATCCCCTCCTCT GTAATTTCCACTGCAAGCTTTTCCCAGGCCTTTT[C/T]AGGCA AAGCGGGGAGTTTTGAAAATAAATCCCCCAGGCTTGGAGAAGCA AAGAATCAATGCTAAGCAGCTCCGGAAATAATAGCTTCCATCTC TCTGATATATAAAGAGGATAAGGAAGGCAGAAAGAAGGGGCATG ATATTATGAGATTGCAACAATACATTGCAACATTACATTAAAGA ATTACAGAAAGCAAGATCTAGCTTCAGATGCCAGTTCATGCACT TACTCCCTGTGTGACCCTGGGAATCACTTAAGCTGTCTGAGACT TAGCTTGTCTAATGACAAACTGGGGATACTAATATCACCTCCCA GGATTGTTGGGAAGGTAAATGGAGATTGACAAATGTGAACACAC TTAGTATGTCTTTACATAGTAGGTATTCAATAAACTCTTCTATA TATCTTCTCTTTCTGAAAATCTGAATATGGGGAGCATGGATATG	SEQ ID NO. 210
KCP_1989 33	GTCCCCACCACTCCTTTTTATTGCAGAGGGAATTGACATTCAGG GAATGGAAATGCCCAGCCCAGAATTGGGGATGTGGTCTGGGAAC CCAGGTCTCCCATCCCACTCCCTCGCCCTCTCACCCCCTCCCGC TGGTCAGTGTTCTTTGTCCTCTGCTGGCATCCCTGGGGACGGGC CAGCCCCCATCCCCCCGACACACACACATTGTCCCTTCAAGATG GAGCCAGGCTGACACCACGTAGAATGACCTGGAAGCCCCCACTC AGTCTACCAGTCCTCCCTCCTCACACAGGAATAGATGGGAGGGA AATGAAATAAGCTGCCATCTGCTGTGCATCCTCTGTGTGCCATG CTCTGGGTACCCATCTAATCCTCGTGAAGACCCTGAGAAGTGAG TGTTCTTCACAGACTAGGCAACACCAGAAGGCAG[G/A]TGAAG AACGTACAGAAGCTACAGAGTGCACAGGTGACAGGTATGAGAGC CAAGCCATTCAAACTCCCTGGGTATAGGACCCAGCTCTTCCCAC GTCTCTGCCTTTACCGAATCAAACACCTGAGCACGGAAGACCCT CCATCAACATGAACTGCTTTGAATTGACATGAACAAGCTTCAAT CAAACTATAAATGCTGAAATTTTTCAATTATAGAAAGTATTTGA AAGATCCCATAAATTCCCCTGTCATATCACGTGAGCTGCATTTA CTGCAGCAGACACTTTTTATCTCGGGCTTGGAGGAAGGATTAGC AAGAAGAAAGTGGAGGGGGTCTGAGGAAGGGCTGGCAGCCTAGA GGAGGACAGCAGCAAGAAGCAGGCTGGAGGCAGTTCTGTGCTGC CGGCCTTCATGGGTGTGGCCTTTGGACAGCACCTTAGCAGGAAT GTGGTGGAGAGCAGCCCCATTCACTCCAGAGGAGAGC	SEQ ID NO. 211
KCP_1993	AAGACCCTGAGAAGTGAGTGTTCTTCACAGACTAGGCAACACCA	SEQ ID

65	GAAGGCAGGTGAAGAACGTACAGAAGCTACAGAGTGCACAGGTG ACAGGTATGAGAGCCAAGCCATTCAAACTCCCTGGGTATAGGAC CCAGCTCTTCCCACGTCTCTGCCTTTACCGAATCAAACACCTGA GCACGGAAGACCCTCCATCAACATGAACTGCTTTGAATTGACAT GAACAAGCTTCAATCAAACTATAAATGCTGAAATTTTTCAATTA TAGAAAGTATTTGAAAGATCCCATAAATTCCCCTGTCATATCAC GTGAGCTGCATTTACTGCAGCAGACACTTTTTATCTCGGGCTTG GAGGAAGGATTAGCAAGAAGAAAGTGGAGGGGGTCTGAGGAAGG GCTGGCAGCCTAGAGGAGGACAGCAGCAAGAAGCAGGCTGGAGG CAGTTCTGTGCTGCCGGCCTTCATGGGTGTGGCCTTTGGACAGC [A/G] CCTTAGCAGGAATGTGGTGGAGAGCAGCCCCATTCACTC CAGAGGAGAGCCTCAAACTCTTCAGGCAGATCTAGCCTAGGTAG AATCTTGGCCTGGCCCCTCCGGGATGACAGGTGCCATTGCCCAA GAATGGGGAAAAGGCTGAAGTGCTCCAGCCAAAGACCCCAATTT ATCTTCAGGACAATTTTCACTGGAAACCTTGCCTCACCACTGCC CACTTTTTCAGAAGTAATTAGAATGCTAATCTATAAGAAAGATG ACTATTAAAAATAAATTAATAATAGATAATACATTTTGGCTTAC AATTTTGAATAATATAGCCATCCCATCTTAAAGTAAAAATTCAT ATATTTTTAATAAGCCTGAGACATGTTTTCCAATGAACCACAGA TGGTTCATTTTTATTATCCTATAAAGAGACATTATGGGCAAGTG TTTTTTAAAATGGTAAAACAGAACCTTAGAGCAGCTCTCTTTT	NO. 212
KCP_2002 41	GGCAAGTGTTTTTTAAAATGGTAAAACAGAACCTTAGAGCAGCT CTCTTTTGAAGATCTCTAAGCACTTTCTAAGCATCAGGACCCCC TTCTGTCATCACAGAGACTGAAATGAGGAGATGGTCTCTGTCAC CCCCTCACTCACCAGTGAGCCCCAGACCTTCATCCCTGATCAGA TGGAAGCAGTGTGGCATGATTACAGTTCATATTTCAACTCTGCC ACTCAATGACTAATAGCCAAGCACTAATAATGCAGAAAATGTAA ATTTAAAAAATAATCTTCCTGAGATTGGTTATGAAATGCACTCA ACACAGCACCATCCACAGAGAGGTTCTTTTTAATTGCTCTTTTC TTTCCTCTCGACACCCAGAATCACAAAGCATGCCTGAAAGCGTC ACACATATATGTCTGTGACCATAACATGGCATTGCACATGCAAA GGAAATAA [A/G] TAGGTGTTACCCATGTGACAAAGGTCCATGA GCTCTGTCCGCAAAAAGCTGTTGAGTTTAAAGAACAAATAATTC TGAAAAATCTTCCAGGAGATGAAATTTGTAGAACTCAAGGGCAG TAAACTAGCTGCTTTCCAAGGACTTGTCATAGCTTTATTGACTT ACAATAGCCAAAGATAAGTCAGTATTAATCAAACCCATTCTCTA GAAAAACCTCATCATCACTGGGGCCAGGGCAGAGAAGTGTGACA CAGCTCTCTCCAGCTTCCCCACTTCACAGCATGGTTCCACCATC CACCCAATTGCTAAAGCCTGGATAGTCTTCCTTGTCACCTCCCG ATCCCCTTCTCTAACACCCATCCCCCGGCCACCCAACATCAGCA AGTCTGGTGGTTTCTCTCTGTCACAGAGATTCAAGATCTTCCC	SEQ ID NO. 213
KCP_2019 85	TCGTAGTGTTCATAGACTCTCCTTCCTTCCTAACTTAAAAGAGG CTCCTTCTGGTTTTTCCTTCATACACTTCCCTCACTCTTTTCCT TCACTGCACTAAAGATGATTTCTAATTGCATAGTCATTGATGCC AGTATTTGTTTATTGTGTCATTCCTGCTGAACAGAGGATGGGCC TGACTTATTTGGGACCATGTTGCTGATGCCTGGACCTAAGCCTG GCACAGAGTAGGAGCTCAACAAATTTGTTAAATGAGTGGCTGAA TGGCCATACTCTCAAAGGACCCACAGTCTAGGAGAGACAGAAGA ATCTTTGTCTTTTTGTCTTGCAGTGGGATGGAAGCTGCAGGGAG GGGTCTTGTCACATTGATACTGTCTGGGGAAGACAGAAAAACTT CAGTTTCAGAGGAGGTAGCCCTTGAAAC [G/A] AGATTTGAGAG AGGGCAGCACATTGTACAACTCCATGGGCACCATGCACATTGTA GTCCAGATAAACAGAGCCCCTTGGAGATATGTGAGGCATGGGAT AGACTCAGAGAAACCCAGGAAATAACCCCTTCAGGCATCTGACA TGCAAAGATGTGGAAGTGTCAACCAGGAAGTCATGTTGGGGGAA CAGCAAGTATTTACAGAAAGTGACTGTGTGTGTCTGTGTAGGAG GGTGACTTTGTATAGGAGAGATAAAACCTGTGAGCTAATCAAGG	SEQ ID NO. 214

	AGAAGATCATAAAAGACCTTCATAAAGAGCATGGCCTTTTTCCT GCAAGCAGTGAGGAGCCATTGAAGGCTTTAGCATAAGGACAGTC AGATGTACTTCCCTAGAATGCACATTTCCTTCTGCTCCAGAACT TCTGCACAGGAGGCTCCTAAAAGCTCTCCCCATCCTCCCTGTAC ACGTAGAATCTGCCTCTGTCTCTCTTTCTCTCT	
KCP_2020 67	CACTTCCCTCACTCTTTTCCTTCACTGCACTAAAGATGATTTCT AATTGCATAGTCATTGATGCCAGTATTTGTTTATTGTGTCATTC CTGCTGAACAGAGGATGGGCCTGACTTATTTGGGACCATGTTGC TGATGCCTGGACCTAAGCCTGGCACAGAGTAGGAGCTCAACAAA TTTGTTAAATGAGTGGCTGAATGGCCATACTCTCAAAGGACCCA CAGTCTAGGAGAGACAGAAGAATCTTTGTCTTTTTGTCTTGCAG TGGGATGGAAGCTGCAGGGAGGGGTCTTGTCACATTGATACTGT CTGGGGAAGACAGAAAAACTTCAGTTTCAGAGGAGGTAGCCCTT GAAACGAGATTTGAGAGAGGGCAGCACATTGTACAACTCCATGG GCACCATGCACATTGTAGTCCAGATAAACAGAGCCCCTTGGAG [A/G] TATGTGAGGCATGGGATAGACTCAGAGAAACCCAGGAAAT AACCCCTTCAGGCATCTGACATGCAAAGATGTGGAAGTGTCAAC CAGGAAGTCATGTTGGGGGAACAGCAAGTATTTACAGAAAGTGA CTGTGTGTGTCTGTGTAGGAGGGTGACTTTGTATAGGAGAGATA AAACCTGTGAGCTAATCAAGGAGAAGATCATAAAAGACCTTCAT AAAGAGCATGGCCTTTTTCCTGCAAGCAGTGAGGAGCCATTGAA GGCTTTAGCATAAGGACAGTCAGATGTACTTCCCTAGAATGCAC ATTTCCTTCTGCTCCAGAACTTCTGCACAGGAGGCTCCTAAAAG CTCTCCCCATCCTCCCTGTACACGTAGAATCTGCCTCTGTCTCT CTTTCTCTCTCCTCCTCCTCCTCCATCTCCTCCTCCTCCTCCTC	SEQ ID NO. 215
KCP__202 795	GCTCCAGAACTTCTGCACAGGAGGCTCCTAAAAGCTCTCCCCAT CCTCCCTGTACACGTAGAATCTGCCTCTGTCTCTCTTTCTCTCT CCTCCTCCTCCTCCATCTCCTCCTCCTCCTCCTCTCCCTCTCTC TCGCTGTCTCACACACACATACACACACACTCCTTCCTTCCTAT CTAGTCAGATTCCACTCCTTGGGATTTCAGGCCCACCGTCACTC CTCAGGGAAGCCTGCCCTGAATGCCTGCACTACACCAGGGCCCC TTTCCCCTGCCCCCATCCCAGAGCACCAAATAGCTTTCCCTTGC AGCACTTCTCACAGCTGTCATTTTATGTTTGTGTCTGTGATTCT TAGGTTAAGTCCCTCATGCACCAAATCATAAGATCTGGGAACAA GGACCACACCTGTCCTG [C/T] TCATCACTGTAATCATCACACT GCCTGCCAAAGTGCCTTGCACATATTAGATACTTAGTAGTTATG TGTTCCATGAATGACTCTTTAAGAGATCTTCTAGCTGTTCTTGC AAAGAACCCATTGGTAAGGTTGAACCTACAGGCTGATACTTTGC ACTAGTCTCAGGAAGAGATGGTGAGTACATGAAATTGAGTCCCC CAGAGGTTAATGCCCAGTGCCCCAGCTAGGAAACGTCCAAGGAG GCAATTTGAACCCCATCTGTCTGGCTGCAGAGCCTAGCCCTCTA ATGCATTCAGGGGTCCTAGCTCCTCGAGGATGCCACTGTGCCGT GAACTTCTTTCTGACCCTCATGGCTCCCAGCACAGCATCCACAC TCAGAAGTGCAAGATGAATGTTTGCAGATAATGAACATAAAGCT CTCAGGAACCCTCATCTCCTGAGAATCTGCTTTGGCCCCCACAG CAGGTCTGGGTGTGGACCTTCCCCA	SEQ ID NO. 216
KCP_2042 42	GTGGCAAAGTTGGGATCTTAACCCAGTTCTATGTGGCTATAAAG TTCATGGAATAGAATGCTGCAGTTAAGAACATGGGCTTTGGCAT CAAGCAGACCTGTATTTGAGCCCCACCTCTGCTGTTTATTAACT GTGGCCCTGGGCAGATGACCTTACATCCTTAAGTCTCTAGTTCT TTGTCTTTAAAAGGGTGGCAGAATGTACCTCACTGGTTTTAGGA AGGTCACATGAGATAGTGCACATGAAGCCCTAGGCATGGGAAAA TTCTTCTAAAATGTCAGCTGCCATTCTGATCACTGCAAGACCCC CACCCCCAATACTCCCAATTGTACCACCCCACCCCACTCACCAG TGTCTCAGAAATGCCTCCTCCAGAAGGAAGGCATCCTGTCTAAC CCACTGCTTCTAGCCAAGCTGTCTTTCTTCAGAAGGTAGAAAAA GATTGTTAGTCATTGTTTAATCTTTATTGAGTATATACCGCCAC	SEQ ID NO. 217

	ACCAATTGCACTGCCA [C/T] TCATTATCTCATTTAAATCTGAC AAGAGCCTTGTAAAGTAGGGATTATTCCCACCATTTCCCAGATG TTGAAACTGAAATTGATAAACACGACATGTTGCCATGGCTACAT GAAGATCTCCAAGCCGGAGGATCTCCACCCTCACCTGCCTAGCT TCCCAGACCTCTCTGCAGAAAAGGGACTGACCCCCAAGACAGCC CTGGCCTCTGGGCTCCACCCCTTCCACATCCATCCCAGGGCCGC TGAGGACTGAAGAGTTCTCCACGTTTGCCCTTTAAAGTGACTTA AAAATAATCTTTATGAATTTCTTCATATACAAAATTTGTACTTA CTCATTGCAGCAAATTTAGAAAATACACATAAGCAAAAAAGAAC GTAACAGCCATCCATAACCCTAACTCTCAGAGATCACCACTATT AAAATGTTTATTATCTAAGAGAGAGATGATATAGACAAAGATGA GACAGATTGACACAGAGAAGATGGGTACATGATAGAT	
KCP_206267	TGCTCAACTGTAATCAAACATTATTTTAAAAAATCATTCCAGC CTGGGAAACAGTGAGAAACCCATCTCTACAAAATAAAAAATAAA AATTAGCTTGGCATTGTGGCATCTGCCCGTGGTCCCTGCTACTC AGGAGGCTGAGATGAAAGGATCACTTGAGCCTGGGAGGTTGGGG CTGTGGTAAGCCGTGATTGCCCCATTGCACTCCATTCTAGGCAA CAGAGTGAGACCCTGTCTCAAAAAAAATATTATTCATTTAATAT CTGTTGCCACCACAGGACTGATCCCTCTGTGAGGGCAGAGATTG TTCATGCATGGAATTGTGATTTATAAGCACTGGCTCTGGAGCCA GGTTGCCTGAGCACGGAGCCAGCTGTGCCCTGCGGGACACCTGT GGCACACTTCACTCCTGGGACACCTGGGACACGCACACAATAGA AATGTTCACATTTTACTAGGCAATGCCAGTCACATAGTCCTACC TAATTTCAAAAGGGTA [A/G] AAGGTACACCCAACACGCATCAG GAAGGAGGAGGACCAGAAATTGTTGGTGACAAGCACAAATGACC ACCCCAATATAATATTTTGTTTGGAAGGCATTTTATTCCACAAA AACAACATTACAATAAACACAACAACAAAACACTGGTTGCAGTA GAACCAACTTTCCAGACCTATCTGCACAGCACAACCATTATCCC ACTCAAAATGTCATGTTTTTACCCAAAACATTAAAATTTTAAAA GCAATTCAAACCCATAGCTTAAAAAATGTTCCAACCAGTAATAA AAGGAAAAGTGTGCCTCCTCCTCCCAACTTCCCTACCCCACAAT CGCAAGATATTATCCTTATAGGCGAAAAGGGTTTCAGGATTTGA GATGCAGGCTGGGAGGTCTGAGAAGACTTCCTATAGAAGACATG ACTTCAAACTCTTTCTTGTATGTGAGATTTAATTTTCAAAGACT CCTCTGATCCAACTTAAGCTTTATGGTAAATCACCTT	SEQ ID NO. 218
KCP_207661	ATATGCCAGCGCTCTATCTGCAGGGGTTCTTTTGATAGCAGCAG ACTGAGAGATGATGTTACTGTCCCCTTTTTCCTGTTGTTGGCAA CTGAGACTCAGAGGATGGAAGTGACTTGCTCAGGTCCACCACCT CTTCAGCTGTGGAGCTGCGACAGGAGCCTTTGTTTGACTTCAAA GCTCACCATCACTCCTCTCTCACTGATGCTCAAGTGGGCTATCA CCTCGCCTTTCCTGAGCCTTCCTTCGCTATCCTAAAACAGCGCC TCCCGAAATCACCACTAAAGAACTTATTCATGTAACCAAACACC AGCGGTTCCCCTAAAAACCTATGGAAATAAAAATTAAAAATAAA AACAGTGCCTCCCATGACCCATGTCTCTCCAGTCCCATAACTCT GCTCTATTTCCATTCACAGCTCCATCCCCACCTTTATGTCTTTT GTTCACTGCTTTATCCCCAGTGCCTAGAAGAGTGCTTGGCACCT AGTAGACACTCAGTAA [C/G] TATTTGTCGAATGAGTTAATAAG GTTGTGAAAAGAACGTTAGATTACTGGAAGGATTCATCTGAGTT TAATTCTGCTATGCTGGGAATCCAGTGTGCGGCCTTGGATGAAG CCAGTTCCCTCCCTGGGCCCCAGTAGCCACATCTGTACATTTAG AGGGCAGGAGAAAAGCCACACGCTCTGTGACTTATACAACTTGT TGCCCAGAGTGGAGGCTGCTTTGATGCTCAGAAAAAAGAAACAA ACATGGAAATGCTAAATGGGTGGCAGAGAGCTTGAGGGAGGAAG GAGATGGGGAGGGTACTCTTGAAACTGTTTGGTGTCTTCCCTCC TGCCCCCTCAGTACCAATTGTCAAGTACAGAAAGTGAAGGAGAC TTGTATTAGTGGAATTTGGTCCCTGACTTGTTATAGAGACACAA TTACAAAGACACAAGAGTGGGCCCAGCAGAGACCCTTAGGGTGG	SEQ ID NO. 219

	TCCCTTGAGGTTCCAAAGCATCTGCCCATCAAGCAGA	
KCP_207965	CACCAGCGGTTCCCCTAAAAACCTATGGAAATAAAAATTAAAAA TAAAAACAGTGCCTCCCATGACCCATGTCTCTCCAGTCCCATAA CTCTGCTCTATTTCCATTCACAGCTCCATCCCCACCTTTATGTC TTTTGTTCACTGCTTTATCCCCAGTGCCTAGAAGAGTGCTTGGC ACCTAGTAGACACTCAGTAAGTATTTGTCGAATGAGTTAATAAG GTTGTGAAAAGAACGTTAGATTACTGGAAGGATTCATCTGAGTT TAATTCTGCTATGCTGGGAATCCAGTGTGCGGCCTTGGATGAAG CCAGTTCCCTCCCTGGGCCCCAGTAGCCACATCTGTACATTTAG AGGGCAGGAGAAAAGCCACACGCTCTGTGACTTATACAACTTGT TGCCCAGAGTGGAGGCTGCTTTGATGCTCAGAAAAAAGAAACAA ACATGGAAATGCTAAATGGGTGGCAGAGAGCTTGAGGGAGGAAG GAGATGGGGAGGGTAC [C/T] CTTGAAACTGTTTGGTGTCTTCC CTCCTGCCCCCTCAGTACCAATTGTCAAGTACAGAAAGTGAAGG AGACTTGTATTAGTGGAATTTGGTCCCTGACTTGTTATAGAGAC ACAATTACAAAGACACAAGAGTGGGCCCAGCAGAGACCCTTAGG GTGGTCCCTTGAGGTTCCAAAGCATCTGCCCATCAAGCAGATGA TGTGATTAGTCTCTGTGACCCCAAGGATGCCTCCTGAAATTGCT GATTCAATTTCTCCTAATAAAATAGGAACAATAATTAGCTAATA AGAAATCAACAATTAAAGCTATGAGAGAATTAAGTGAGATCATG TAAGCAAAGTACATGTCACAGTGCTCTGCAAATAGGCAGTGCTC AGAAGTGTCACCTTTTCTCTTTCTTCTCTGAGCCTCCGTCTTCT CTTCGGTAAAATGAGAATAATATTATGCATACCTCACAGGGGTT AAGCAATGTGAAAGTACTCTGTAAAGTATAAGGCTGA	SEQ ID NO. 220
KCP_211525	GAGATGATCAACAGTCTTTCATCCAGAGGGTTGTGTTTGCTGGT GGCCATTACCTTTAACATAAAACGATCATATTTACTTTATCCTA TTCATGTCCAACCTCAACTGACAATTGAGTTGTGTCTCTGACAA TAAATAGCAGAAAAAGGAAATCTTCCTATACTGAAGAGAAACAC AATTAATTAACTAGATCCATCAGGAAAGGTACAATCATGATTGA GACAGTGTTTAACAGATGTGACTATTGGATTCTGTTGTTGAGAA TGACCCTTAAAATCACAGTCAAAATATACGACAAGATGGAAATA ACATTTTTGAGCACCTACTATGCATGTAGAGCATCTTACATACC TTATCTCACTTAGATTTACAGCTGCAAGGTGGGTATGATTCTAG CTTGAATTAGTCTAATAACCATATACCTCCTAGGGGCAGTGAGA TGATTAGATCAATTCTAAAACTATTACCATGCTCTCTGAGCTCA CCAAGACAGGCAGTTA [A/G] TACAAGGATACATTAATACCGAA TCCAGCAAAAGCTCACATGGCCAGCTTCCATTATGTTCCTATTT GTGATTATTCTGTATCAAGCACAGAAATGTATGTTCACACGAAC AACAAAGAAGGGGTTTATTAGTGTGGATTACAGGGCCTAAGCCT ACCCTCTGAAACTGGTTTTGGAGTCTTTAGCACGCTTGTTTGGG ACAGTTAAACATGTGCCAGCTATTCTAAAACAGTAGCAGTAATG TGATAGAGCTGGGTCATACCGTGCTTCCCAAAGTATGATCACTT CATTTCAACAACTTCACACTAACAGCCTGAACTGGGCTGTGAAG GGAATATTTAGACCAAGGAAACTGGAAAACTGTATCAATCAGGC TTTTCCACCCTCCCCAAGAGCCAGTTGTCAGATATCTACCAGCC TACCAACGCTAGCTCTCTAATCAGAAACCATCACTTAGCAAGTT CCCAAATTATCTGCAGAGCAATGAACTCCTCTTCTTC	SEQ ID NO. 221
KCP_211850	CTATGCATGTAGAGCATCTTACATACCTTATCTCACTTAGATTT ACAGCTGCAAGGTGGGTATGATTCTAGCTTGAATTAGTCTAATA ACCATATACCTCCTAGGGGCAGTGAGATGATTAGATCAATTCTA AAACTATTACCATGCTCTCTGAGCTCACCAAGACAGGCAGTTAA TACAAGGATACATTAATACCGAATCCAGCAAAAGCTCACATGGC CAGCTTCCATTATGTTCCTATTTGTGATTATTCTGTATCAAGCA CAGAAATGTATGTTCACACGAACAACAAAGAAGGGGTTTATTAG TGTGGATTACAGGGCCTAAGCCTACCCTCTGAAACTGGTTTTGG AGTCTTTAGCACGCTTGTTTGGGACAGTTAAACATGTGCCAGCT ATTCTAAAACAGTAGCAGTAATGTGATAGAGCTGGGTCATACCG	SEQ ID NO. 222

	TGCTTCCCAAAGTATGATCACTTCATTTCAACAACTTCACACTA ACAGCCTGAACTGGGC [C/T] GTGAAGGGAATATTTAGACCAAG GAAACTGGAAAACTGTATCAATCAGGCTTTTCCACCCTCCCCAA GAGCCAGTTGTCAGATATCTACCAGCCTACCAACGCTAGCTCTC TAATCAGAAACCATCACTTAGCAAGTTCCCAAATTATCTGCAGA GCAATGAACTCCTCTTCTTCAGAAAGCAGGCTGAAAGATACACT GTTCACATCTTAGCCTGACCTGGACCCAGTGAGTTTCCATCAGT GAGAAAATTCTGTGCTAACTTGAGATAATACTATTCTTGTGGCA ATTTTACTTTTCCTTTGAGCGATTCCTTCAACCTCTCTCTGCCC CTTCATTTTTCCGTCTTAAAACTAAAAGTGCCCTTTCTCCCTGG ACACTCCTCATTTGCAATGAATTGTCATTTCAGCTCCTCAGTCA AGAGGAGTAATGAAATCCCACCCGTGTTAATCCTCTTATATCCC GCAGAAATATTGTAGACCCACTCACCCTAGGCAACAT	
KCP_2127 75	AGTAATGAAATCCCACCCGTGTTAATCCTCTTATATCCCGCAGA AATATTGTAGACCCACTCACCCTAGGCAACATGCCCTCTCTCTT CAACACAGGTCATCAATTGTTCATTTACTGGCTATCTCCATGTA CTGGAACTTCAGGGTGGTGTCCAGCTGGGTTCAAAGGAGAAACA GTGGGAAGTTTCTCCACTGCCACCTGAATTAGATGAGAAAGAGT TGTCTACTGAAATACACTAGCTGGTGGCAGGATTGGGACGTCAT TTGACTAATTGCCTCCTAGAGCTGCAGAGACTGCTGGAACTACC TAAGTAAATCATCAAAAAAAAAAAAAAAAAAAAATCATCCCAGGG CACTTTTTCCAGACAAAAAGGTCCACTTAAAACATCCTCTAGAG ATCTGTGCCTGAAGCTGAGCTGCTGCAATGAAACTGACATTTCT GCCTTGCAGCCTGGCCATGGGCTTAGCTGGACTAAAATGCTGCT GCAGTGGTGAGGGCAC [A/G] TGAGAGTCCCTAATGTACATGGC CTTGCTCCTTGTCCTGACACATCTTTTAGGGCTGCTGCTTTCTC TAGTGCTGGAATCTAGATAATTCCTTTCCCAGCCGTTTGTTTCT TCAATCTTGGAAAATATCTGGATGAATGTAACACTGTCACACAC AAACAGAATTATGACTTACGTCACATTCTATGTCGTGATTTTGT GGACTTTTAATAATTGCATTACATTTGTGACCATTAATTTCCAC CATCGCCCTGCTCCTGAGAATCTGTAAGGACATTTGACACTCC TCTCCCCACCCACCTCAACATTTGTGCTGACCTGAAGGTCACAT TAAAAACATACCCATTTGGAGAGAAAGATCTGTCTACTGAAATA CACTAAATATTGAAGAATTTCCAAGTCATTTGATCTTGAAAACT CCATCTAATGGAAGCAGAAACACTCAAAGGTTTTTTTTTTGGA CTCCCTTTTTCAGGACACTTTCAGGACTGAGGTATAT	SEQ ID NO. 223
KCP_2217 99	TCAGACTTTGAACAAACCTCAGAAGGAACTGTCAAGGAGGCTCC CCACGGGTTCACGCTCTTCTCTCCTCCTGCACACAGGGAACAGG GCCATTCTCCTTCCTTTACTGGGACTACCTGGGCTTCATCCAGG GAATCCCCAGGTGGCAACAGGAGGGTGGTGAAAACCGCTGCCCG TCACCTGTAAAGTTTCCTGTGAATGTGTCTACAGCGGCCAGCAC CACAAGGCATACAAAGAAAGGGAAGGGAGAGCTGATGTGAGAGC GGCAGCGTGGGCACTCCTGTGAGGTTGCCACAGCTGTAGACAAG TTAAATCAGTGCAGTTCAATCAAAAGTCATGACCCATGAGCGTC ACAACCAGCACGAGTCTACAAAGGAATACATTAAAACTAAGACC AGAGCACAGCTCACATTAGTGAGGGATGGGATCATTTCATGGAG TTTTTGTTTCAAAATATTTCATTAACATTTCACTTATATACATG TGTGTATACTGGGTTGTGAT [A/T] TAAATTACAATTCTTACTA TAAAATACAGCAAAAGAAAGAAGAAACAAAGAGAGGGCCACTGG TTTACCTAACATCCACAGGCAGGCTACTTCCCAGCATCTTGAGC CCCAAAGAAGTAAATTTCCTTCCACAACCGATGTTACCACAGCC TGACACTTAGCCAATGATGAAAACGAAAAACAAAACAAAAGCTT GGCAGTCAGTATCCAAATATGCAGATACTACAGAATCTGTTTGA TGTAGAAGTTGATCCTGCTACCCAGACAGCAAACAACTCATTTA TTAATAAAGTCCAGTTCCTCCTTAATGAAGTGGGTTTAATAGTT GATATCTCAATAATTACTTAGTGCATTTTTTATGAAGGTGATGG GAAACAAGTGCTGTTTCTTGAGTCGGAAAGAGTCTCTCAAGCTC	SEQ ID NO. 224

	CCACAAAGAAATTTCCCGAGCTTGTGAGGAATTCAGTCACAGGA AGATCAAGGAATT	
KCP_223568	GATCTAATGCTAGGAGATTCAAACCAACAATTAATTTCTCTGTT AAAATGGGTTAAAATAGATGTAAAATATTAATATGTATATAAGC ATTCTGAATTAGACTTATGTGAATTTTTCTCCTTTTCTTTCTTT CTTTTTGAGAATAAGCCCTTTCATTTACGTAGAAATGCTTCAGC GTTTAGATAATTGCTACTTATCTTGTTAGCTACAAACACAACCA TAATTAAAGGCTCTGTAAGAATTATGAATTCTGGGGAAATTGGC CACTTGTCTCTGTGGCGTAAACAGTATCTAATTTATAACAAATC ATCTGCCTTAGTCCCAGCAGGATAAGGTGATATGTATTGCCCAG CACATGAGAAAGATGGCAATTAGGAATTGTTACCAAGTTACGGG AGCCTCACACGAACATCCATCACCTTTGGGGATATGTACAAGAT ACAAACTTAATTTGATGGATTCCTTTTGTATTGGGATCAAAGTC TCAAAAGGGAAAGTGACAATTTCAGGGAAAATCTGGTGCAATGA GACCAACACTGATGAGAGAAATGCACACAATTTAATACACCTGC TCACCTGATGTGGCAACTCAGCCTGTGCTTGCTGTGGGTTGCCA CAGGATGAGACATGGTCTGTGCATATTCCCAGCAGCCACCCATC TCATCACTATTCTTGCCAGCCCAGATTTACAGTTGTTCAATAGA TGGATTTGGTAATATCTGCATGACAACAACAGGCAGAGAAGGTT AGATGGCAATTGATTCTTGATTGGTGTAAGTTTATAGAACACAT TCTGGCAGGGCCCAAAGGAAATCACTCACCTACCCCTCTGTGAT GGTAAAACGTTGAAAATTCCACGGACTTGGACCTTGTGATCCTT CAGTGGAAGATGGGCAGATTCCTTGCTTTAATTGACAGACACTT TCTAAATAACTAATGCAATCTTATATTACATTATAGTCCATAAG GGAGACATACTTAAACTACTACTTACAACAAC[G/T]GTTTTTA GAGCCTTTCAAATGGTTTGTACAAAGTAGCTCCCATTTAAGATA TTTTCCTAGTATTTAAGGCTATCTAGTAGACATTACAAAACAAT ACGCTGTAAATACATTCAGATTTTTATCAGTAATACTTAACATG CCGTAATTTGAACTTTCTGCTAAATCATGCTATCCATTCCTAGT TGGCCCCAATGGTGAGAGTTTACTGTTTCTTTAAATAATTTTGT TTCCCTTTGCTGTCTAGAGGTGTTTATCATTCTGCTTACTTGCC TGTGTCTCTGGAATATTCAGAAGGTTCCATGGAAACAATTTGA ATATGCAAAGAAGTTATTTTTAAAGCAAGGAAAATGTTTTCATA TGGATTTATTTTGAGCACTTCTGCCTTTGCCTCCACTGGGAACA TGTTTCTCTCCAACGCCGAAGCCCCCTCCCTGTGTGGTGTTTGA CGCAGAGGCTGACAGGGCAGGGAAGTGGGGTTCAAGATAGGAAG GCCATTGGCAGTGTGACCCCAGCCCACAGTCCTAGATCCCAGGT CGTGACACCACTCTTTTGACAGCCCAGATTGTTACCTAACAAGA ATGACTCCCAAGCTCAACCATTCCAATGCCATCTCCTCTGGTTC CAGATAAGATTGAAGATGAGCTGGAGATGACCATGGTTTGCCAT CGGCCCGAGGGACTGGAGCAGCTCGAGGCCCAGACCAACTTCAC CAAGAGGGAGCTGCAGGTCCTTTATCGAGGCTTCAAAAATGTAA GACCCGTGCACGCTCTGAAGGCCTGGGGGGGGTTCCCACGTGAG GCTACACTCTCCCCAATGCCAAGGGAGCTCATAAGGCGTTTCCC ATATGTGAGGCTGTACAAGGAAGGCCAGCTCTATAAAGGGGGCA TGAGAGGGAGATCACCTGGCTAGAAAGGAAGGCTCCAGGCGAGG ATGGAGCAACCTCAGGAGACAGTAAACGGCCAACTGCCCAGAAA TTTCACAGGGTGGCACATCCTCAAG	SEQ ID NO. 225
KCP_1152	GATTTTTATCAGTAATACTTAACATGCCGTAATTTGAACTTTCT GCTAAATCATGCTATCCATTCCTAGTTGGCCCCAATGGTGAGAG TTTACTGTTTCTTTAAATAATTTTGTTTCCCTTTGCTGTCTAGA GGTGTTTATCATTCTGCTTACTTGCCTGTGTCTCTGGAATATTC AGAAGGTTCCATGGAAACAATTTGAATATGCAAAGAAGTTATT TTTAAAGCAAGGAAAATGTTTTCATATGGATTTATTTTGAGCAC TTCTGCCTTTGCCTCCACTGGGAACATGTTTCTCTCCAACGCCG AAGCCCCCTCCCTGTGTGGTGTTTGACGCAGAGGCTGACAGGGC AGGGAAGTGGGGTTCAAGATAGGAAGGCCATTGGCAGTGTGACC	SEQ ID NO. 226

	CCAGCCCACAGTCCTAGATCCCAGGTCGTGACACCACTCTTTTG ACAGCCCAGATTGTTACCTAACAAGAATGACTCCCAAGCTCAAC CATTCCAATGCCATCT [C/T] CTCTGGTTCCAGATAAGATTGAA GATGAGCTGGAGATGACCATGGTTTGCCATCGGCCCGAGGGACT GGAGCAGCTCGAGGCCCAGACCAACTTCACCAAGAGGGAGCTGC AGGTCCTTTATCGAGGCTTCAAAAATGTAAGACCCGTGCACGCT CTGAAGGCCTGGGGGGGTTCCCACGTGAGGCTACACTCTCCCC AATGCCAAGGGAGCTCATAAGGCGTTTCCCATATGTGAGGCTGT ACAAGGAAGGCCAGCTCTATAAAGGGGGCATGAGAGGGAGATCA CCTGGCTAGAAAGGAAGGCTCCAGGCGAGGATGGAGCAACCTCA GGAGACAGTAAACGGCCAACTGCCCAGAAATTTCACAGGGTGGC ACATCCTCAAGGAATTCACCCTGGCCCAGGGTCAAGCCTTAGCC CTTAACATAATCATACCTTCCAACCTGGTGGTGCCCCCACAATA ATGGGATTTGGCCCTGCTGACTTATGCTAACCAGGCT	
KCP_1333	GGCAGGGCCCAAAGGAAATCACTCACCTACCCCTCTGTGATGGT AAAACGTTGAAAATTCCACGGACTTGGACCTTGTGATCCTTCAG TGGAAGATGGGCAGATTCCTTGCTTTAATTGACAGACACTTTCT AAATAACTAATGCAATCTTATATTACATTATAGTCCATAAGGGA GACATACTTAAACTACTACTTACAACAACTGTTTTTAGAGCCTT TCAAATGGTTTGTACAAAGTAGCTCCCATTTAAGATATTTTCCT AGTATTTAAGGCTATCTAGTAGACATTACAAAACAATACGCTGT AAATACATTCAGATTTTTATCAGTAATACTTAACATGCCGTAAT TTGAACTTTCTGCTAAATCATGCTATCCATTCCTAGTTGGCCCC AATGGTGAGAGTTTACTGTTTCTTTAAATAATTTTGTTTCCCTT TGCTGTCTAGAGGTGTTTATCATTCTGCTTACTTGCCTGTGTCT CTGGAATATTCAGAAGGTTCCATGGGAAACAATTTGAATATGCA AAGAAGTTATTTTTAAAGCAAGGAAAATGTTTTCATATGGATTT ATTTTGAGCACTTCTGCCTTTGCCTCCACTGGGAACATGTTTCT CTCCAACGCCGAAGCCCCCTCCCTGTGTGGTGTTTGACGCAGAG GCTGACAGGGCAGGGAAGTGGGGTTCAAGATAGGAAGGCCATTG GCAGTGTGACCCCAGCCCACAGTCCTAGATCCCAGGTCGTGACA CCACTCTTTTGACAGCCCAGATTGTTACCTAACAAGAATGACTC CCAAGCTCAACCATTCCAATGCCATCTCCTCTGGTTCCAGATAA GATTGAAGATGAGCTGGAGATGACCATGGTTTGCCATCGGCCCG AGGGACTGGAGCAGCTCGAGGCCCAGACCAACTTCACCAAGAGG GAGCTGCAGGTCCTTTATCGAGGCTTCAAAAATGTAAGACCCGT GCACGCTCTGAAGGCCTGGGGGGGTTCCCAC [A/G] TGAGGCT ACACTCTCCCCAATGCCAAGGGAGCTCATAAGGCGTTTCCCATA TGTGAGGCTGTACAAGGAAGGCCAGCTCTATAAAGGGGGCATGA GAGGGAGATCACCTGGCTAGAAAGGAAGGCTCCAGGCGAGGATG GAGCAACCTCAGGAGACAGTAAACGGCCAACTGCCCAGAAATTT CACAGGGTGGCACATCCTCAAGGAATTCACCCTGGCCCAGGGTC AAGCCTTAGCCCTTAACATAATCATACCTTCCAACCTGGTGGTG CCCCCACAATAATGGGATTTGGCCCTGCTGACTTATGCTAACCA GGCTCACCGAGACTGATGTGTAAGCCGAATGTCGGTGTATTAAT TTACCTTGGGAAATGGAACTGACAGTGGAAACAGACACTCCTCT CCCTTCGCTGGGACCCGCTCTCCTTGGAAGCCACATGGAAGCCA GGTTACAATCAAAAGTGGAGTCAGAGGACGGGAGTTCCTTGTTT AGTTGTTACTTTAAATACATTAATGTGTTCCTGCAGTCTCAGGC CAGTTTGAGAGCTCTCAGATACAATCCTGGATATTAATTTATTT TTTAAGTTTAACTCTCAGAGTGCAATCTTATTCCCAAATCCTGG AGTGGTGTGGAGTGGGGTGGGCTACAGCGACATGCACCTGGTCA CCCTCCCTCCAGGTGCAGTCTGTAGGTAGAGCTGAGCTGGGTCA GTTCCAAACTGACCACAGCCTCAATGTTCTCCAAACTGCTGACC CACAGGGATTCCAGCCCCTCCTGGGAGTTATCTGACAGGTGCTG GGATGCCTCTTCCTTCCACACTAGCCTTGACTGCACATGCCAAG TGCCCAGTTTCCTACCATTAGGGCTTCTTTCCTTCGATGGCAGC	SEQ ID NO. 227

	ATTAGCAGTGGGCAGCCGAGTTGGAGAAGGATCCTGTGGGAAAG TTTTCCAGGCAGGCACTGGGCTCAGAGGGAACAGCATCCAGAAA AGAGAAGAAATCTACACTGCTTGGC	
KCP_2252 20	AATTTACCTTGGGAAATGGAACTGACAGTGGAAACAGACACTCC TCTCCCTTCGCTGGGACCCGCTCTCCTTGGAAGCCACATGGAAG CCAGGTTACAATCAAAAGTGGAGTCAGAGGACGGGAGTTCCTTG TTTAGTTGTTACTTTAAATACATTAATGTGTTCCTGCAGTCTCA GGCCAGTTTGAGAGCTCTCAGATACAATCCTGGATATTAATTTA TTTTTTAAGTTTAACTCTCAGAGTGCAATCTTATTCCCAAATCC TGGAGTGGTGTGGAGTGGGGTGGGCTACAGCGACATGCACCTGG TCACCCTCCCTCCAGGTGCAGTCTGTAGGTAGAGCTGAGCTGGG TCAGTTCCAAACTGACCACAGCCTCAATGTTCTCCAAACTGCTG ACCCACAGGGATTCCAGCCCCTCCTGGGAGTTATCTGACAGGTG CTGGGATGCCTCTTCCTTCCACACTAGCCTTGACTGCACATGCC AAGTGCCCAGTTTCCT [A/G] CCATTAGGGCTTCTTTCCTTCGA TGGCAGCATTAGCAGTGGGCAGCCGAGTTGGAGAAGGATCCTGT GGGAAAGTTTTCCAGGCAGGCACTGGGCTCAGAGGGAACAGCAT CCAGAAAAGAGAAGAAATCTACACTGCTTGGCATCTACCATGGA CTCAATACCACCTAACATAGGTTCATAAGATACCCTTGGGGAAG TTATTGTTACCCCCATTTTACAGGTAAGGATATTGAGGATCAGA GACTGGCTTGGCCAAAGTCACAAAGCTTAGTATTGGCTGAGCCA GGATTTAAACCCAGGTTTTTCTGATCTTAAAGCCCCAAATCTCT CCACCTCACAGTGCCCATTCTCTGACAATGTCTCATCATTTTGC AAAGCAGCTCCAGTCCTGAGATGGCACTACTTGGGAGAAGTGGA AATGCACAGGTCCCTGTCCCTGGGGATCATGAGGAACCCCAGAC ACCAAGGCTGGGCCCAGTCTTCTCCTAGTGCTGGCCC	SEQ ID NO. 228
KCP_2649	GGCTCACCGAGACTGATGTGTAAGCCGAATGTCGGTGTATTAAT TTACCTTGGGAAATGGAACTGACAGTGGAAACAGACACTCCTCT CCCTTCGCTGGGACCCGCTCTCCTTGGAAGCCACATGGAAGCCA GGTTACAATCAAAAGTGGAGTCAGAGGACGGGAGTTCCTTGTTT AGTTGTTACTTTAAATACATTAATGTGTTCCTGCAGTCTCAGGC CAGTTTGAGAGCTCTCAGATACAATCCTGGATATTAATTTATTT TTTAAGTTTAACTCTCAGAGTGCAATCTTATTCCCAAATCCTGG AGTGGTGTGGAGTGGGGTGGGCTACAGCGACATGCACCTGGTCA CCCTCCCTCCAGGTGCAGTCTGTAGGTAGAGCTGAGCTGGGTCA GTTCCAAACTGACCACAGCCTCAATGTTCTCCAAACTGCTGACC CACAGGGATTCCAGCCCCTCCTGGGAGTTATCTGACAGGTGCTG GGATGCCTCTTCCTTCCACACTAGCCTTGACTGCACATGCCAAG TGCCCAGTTTCCTACCATTAGGGCTTCTTTCCTTCGATGGCAGC ATTAGCAGTGGGCAGCCGAGTTGGAGAAGGATCCTGTGGGAAAG TTTTCCAGGCAGGCACTGGGCTCAGAGGGAACAGCATCCAGAAA AGAGAAGAAATCTACACTGCTTGGCATCTACCATGGACTCAATA CCACCTAACATAGGTTCATAAGATACCCTTGGGGAAGTTATTGT TACCCCCATTTTACAGGTAAGGATATTGAGGATCAGAGACTGGC TTGGCCAAAGTCACAAAGCTTAGTATTGGCTGAGCCAGGATTTA AACCCAGGTTTTTCTGATCTTAAAGCCCCAAATCTCTCCACCTC ACAGTGCCCATTCTCTGACAATGTCTCATCATTTTGCAAAGCAG CTCCAGTCCTGAGATGGCACTACTTGGGAGAAGTGGAAATGCAC AGGTCCCTGTCCCTGGGGATCATGAGGAACCC [C/T] AGACACC AAGGCTGGGCCCAGTCTTCTCCTAGTGCTGGCCCTCAAATGCCT CCCGCTGACTCTCTCCCCTTCCCACAGGAGTGCCCCAGTGGTGT GGTCAACGAAGACACATTCAAGCAGATCTATGCTCAGTTTTTCC CTCATGGAGGTGAGTCTGACCTTGAAATCTATCTTGCCCAGCTC CCTCTCTGGTAAGCAGCCTTCCCTTCCTCCAAGTCCTCTCTTCC TTGCCATTTGCTTCCTTCTCGAGGAAGAGACAAACTCAGGGCAG GACACCTCCCTCATCGTGAGAGGTGGGAGTCTCCAAAGCTTTAG CAGGAAAGAACTCTGAAAATGAACCCACCCTGGAAGGGGAAGAA	SEQ ID NO. 229

	GGGCTGATAATGCAACATCACAACGTCTCAGAACAGCTCTAGAA AGCAGGTATTATAATCCCAGATGGAGTAACTGAGTTTCGGGGAA GATAAGCAGTGTACTCAAGATTGCACAGCTGGTGAGTAGCAAAC CAGGATTAGATTCCATAAGGGTCTGAAACAGGTTTTGCCATGCT GGCACCACCATTGTGCAGGGCACTTTTGAATCTTTTCCTTAAAA TAGCTGAGACAAGCTGGAATTTTGTAAAAGAACTTCAGTAAATA CCGAAGACTATAAAAATAAACTAATTGAAAAAGAGGCAGGAAAC ATAAAGTTGTGCTTATTAAGCCAGTTTACAAGTGTGCCAGGCCC ACAACAGCTGCTCTGTTGCCCTGCCCGACTCCTGTGGGAACCAG CTGTGTCCCCATGGGCCTGGACCACATCGGTGACTCCTCCTGT GGCCTCCATGTGTCACATGCCACTTTGCATCCTGTCACCAAGAG CTGTCTCCTGCAAGACATCTTCCCTGGATCCTGACAAAATGCAA ATCCAAGTATTCCAAACACTTCTTGGCCCTGTTTCTCATGGGC CTTTTTGGCAGCAGACAGATGCCTTCCTTGGTGTGTGGGGCCCC TACCCAGATCAGGTGGGGGAGGCAG	
KCP_227871	CCTCTGGTTCTGCATCACCTCCCCCTCTAAATCTCAAGGCATTG GGGGAAGGTCTGGACCATCAAAAGCTCTCAGTCAGACCAAAGAC ATGTTTATCCATTTGTAAGCATTTCCTAAAGATGGGGAAAAGCA GCAGCAACTTTCCCTGGCCTGCAGGAACTCAGGGACTCAGGGGA CTAATAACAACAGTGTATGAGCTTCCGGGCACACTGCTTCCCAG TGGCAGCCCCTGTACTTAGGGCTTTGTATGTATTAATTCATTTA CTCCAATTCCCACAATAACCCTATAGGGTAGGGTTTTATTATTG ATTACCTTTTTACAGAAGAGGAGAGTAAGGCAAAGAGAGATAGA GTAGTTTTCCCAAGGTCAAAGAGCACATAAATGATAAAGGATGG ATTTGAATGTAGGCAGAATGACCCTCAATACAGACTGTTCCTAC AGTCCACGTCCTCAGCCACTAGACCATACGGCCACTGGGATGAT AGACAGACCACTGCAG [C/G] CATGGATAAGGCAAAAACAGGGC TGGCTGTGTTGATCTGTGTCTCTCAGAGCTCCATTCTTCCTCAA GGGGGCACCTTGCAAAAAAAAACAAAAAAATGGGGCAGGGTAGG GAACTGAAGGCAGGAGCTCTTCACAGAGCATAGCCACATCCTCC AGGCAGACAAGAGGACGCAGGAGGCACCATTCTGTGAGAGTATC ACAGTCTGACCCAAAGACACAGCTTCACACTGTCTGATGGCTTG ATGGTTAATGTCACTCTGCCTTTTCCCCTTCTCAGGACTTTGTA ACCGCTCTGTCGATTTTATTGAGAGGAACTGTCCACGAGAAACT AAGGTGGACATTTAATTTGTATGACATCAACAAGGACGGATACA TAAACAAAGAGGTAAGTGAGCTGGGGCCAGGGGTGTGAGAGGGC TCCAGTGAAGGTAACTAACCCAACAGAAAACAGCCCCAGGCATG AGGATAGCACTGTCTGAATGAGGCAGGCTCTGCTTTG	SEQ ID NO. 230
KCP_227987	TGTGCCATTCATACACCAACGACTCCATGCATAGACAGGCAGGA GAATGGTTTTCTCATGATGGCTAGAGGGAGGGGCAAGGGCTCAT CTCACTTTTTGCTAGATCTAACTTCACACCCAAACCCAAAGAGT TGAGTCAATGGGCCCCACTCCATAATTTTCTCCTTTCCATCACC CTAGCATCACTCTCCTCTCTTTCTTGTCGAAGCCCTGCCTTGTT TGGAAGGTTCTCCCTGTGTGGAATTCCTGCCCCCATCACCTGCC CTCCTTTTCTGCCTTGTAGATGCCAGCACGTATGCCCATTACCT CTTCAATGCCTTCGACACCACTCAGACAGGCTCCGTGAAGTTCG AGGTACGCTCATCTGGGGTCCACTCTAGGGGTCCTCTGGTTCTG CATCACCTCCCCCTCTAAATCTCAAGGCATTGGGGGAAGGTCTG GACCATCAAAAGCTCTCAGTCAGACCAAAGACATGTTTATCCAT TTGTAAGCATTTCCTAAAGATGGGGAAAAGCAGCAGCAACTTTC CCTGGCCTGCAGGAACTCAGGGACTCAGGGGACTAATAACAACA GTGTATGAGCTTCCGGGCACACTGCTTCCCAGTGGCAGCCCCTG TACTTAGGGCTTTGTATGTATTAATTCATTTACTCCAATTCCCA CAATAACCCTATAGGGTAGGGTTTTATTATTGATTACCTTTTTA CAGAAGAGGAGAGTAAGGCAAAGAGAGATAGAGTAGTTTTCCCA AGGTCAAAGAGCACATAAATGATAAAGGATGGATTTGAATGTAG GCAGAATGACCCTCAATACAGACTGTTCCTACAGTCCACGTCCT	SEQ ID NO. 231

	CAGCCACTAGACCATACGGCCACTGGGATGATAGACAGACCACT GCAGCCATGGATAAGGCAAAAACAGGGCTGGCTGTGTTGATCTG TGTCTCTCAGAGCTCCATTCTTCCTCAAGGGGGCACCTTGCAAA AAAAAACAAAAAAATGGGGCAGGGTAGGGAAC [C/T] GAAGGCA GGAGCTCTTCACAGAGCATAGCCACATCCTCCAGGCAGACAAGA GGACGCAGGAGGCACCATTCTGTGAGAGTATCACAGTCTGACCC AAAGACACAGCTTCACACTGTCTGATGGCTTGATGGTTAATGTC ACTCTGCCTTTTCCCCTTCTCAGGACTTTGTAACCGCTCTGTCG ATTTTATTGAGAGGAACTGTCCACGAGAAACTAAGGTGGACATT TAATTTGTATGACATCAACAAGGACGGATACATAAACAAAGAGG TAAGTGAGCTGGGGCCAGGGGTGTGAGAGGGCTCCAGTGAAGGT AACTAACCCAACAGAAAACAGCCCCAGGCATGAGGATAGCACTG TCTGAATGAGGCAGGCTCTGCTTTGGGGCTAACAGAGCTGGTCC CTGGCAAAATAAAGAAGGCCTCCCTCATTGCCCTACCCTGCCCT GTTCCCAAGCGCCCAGAAAGGATTAAACAGATTCATTCTCACTG GGTCACCTAGATTCAGTAGATATTACACAGTGGATAAAAATGAC TTGTTTCAGTGTGAAGAGTTACTCTTCCCTAGGGAACCTGCATT TGGGAAGGTTAGGAGCCACAAGTCAAAGCTAAAAGTTGAAATGG TGGAATTGTAGGCAGCACCTAGAATAGAAAAGAAAGATTTTTAA GGAAGAGGAACCTACAATTGGGTCATATTGGCCTTAAACTATTT TGCCTATTAATACAACCGCCAAGGGGGTAATGGAAGGTACAGCT GTCTTTACAGAAATTATCACAAATAATTTCTGAATCTTCACTGC TTTGCACTTTTAGAACCTCAGAGGACATGTCTCTAGCCAGTGAA ATACCCTCAGGTCTATCTCAAAACTCACTTTGGTATCCACTGTA TCCTGGTATCTCAGTGGAAGCTGGAAATTGGCATCCTGTAACAC TCCACTTGCTGAGCTCCTGTGTGCCAGGCACGGTGCCTGGAGGT ATAGATATCAGCACCAATCTTCACC	
KCP_228107	TAGGGCTTTGTATGTATTAATTCATTTACTCCAATTCCCACAAT AACCCTATAGGGTAGGGTTTTATTATTGATTACCTTTTTACAGA AGAGGAGAGTAAGGCAAAGAGAGATAGAGTAGTTTTCCCAAGGT CAAAGAGCACATAAATGATAAAGGATGGATTTGAATGTAGGCAG AATGACCCTCAATACAGACTGTTCCTACAGTCCACGTCCTCAGC CACTAGACCATACGGCCACTGGGATGATAGACAGACCACTGCAG CCATGGATAAGGCAAAAACAGGGCTGGCTGTGTTGATCTGTGTC TCTCAGAGCTCCATTCTTCCTCAAGGGGGCACCTTGCAAAAAAA AACAAAAAAATGGGGCAGGGTAGGGAACTGAAGGCAGGAGCTCT TCACAGAGCATAGCCACATCCTCCAGGCAGACAAGAGGACGCAG GAGGCACCATTCTGTGAGAGTATCACAGTCTGACCCAAAGACAC AGCTTCACACTGTCTG [A/T] TGGCTTGATGGTTAATGTCACTC TGCCTTTTCCCCTTCTCAGGACTTTGTAACCGCTCTGTCGATTT TATTGAGAGGAACTGTCCACGAGAAACTAAGGTGGACATTTAAT TTGTATGACATCAACAAGGACGGATACATAAACAAAGAGGTAAG TGAGCTGGGGCCAGGGGTGTGAGAGGGCTCCAGTGAAGGTAACT AACCCAACAGAAAACAGCCCCAGGCATGAGGATAGCACTGTCTG AATGAGGCAGGCTCTGCTTTGGGGCTAACAGAGCTGGTCCCTGG CAAAATAAAGAAGGCCTCCCTCATTGCCCTACCCTGCCCTGTTC CCAAGCGCCCAGAAAGGATTAAACAGATTCATTCTCACTGGGTC ACCTAGATTCAGTAGATATTACACAGTGGATAAAAATGACTTGT TTCAGTGTGAAGAGTTACTCTTCCCTAGGGAACCTGCATTTGGG AAGGTTAGGAGCCACAAGTCAAAGCTAAAAGTTGAAA	SEQ ID NO. 232
KCP_232521	ATTTCTTAAAGTAGATAAATTTGACTTTATCAAAGTTAAAAATT TTGTGCTTTAGAAGACACCTTTAAGAAAATGGAAATGCAAGCCA TGGACTTGGAAAAAATGTTTGCAAATTATATACCAGATATATAA AGATACCAGGATACCAAACCAATATAAAGACTGGCATCCAAAAT ATATAAGGGACATTTATAATTTAATACAAAGATAAACAACTTCA TATAAAATAGGCAAAAGATTTGATGAGATATTTAAGAAAAGAAG ATATATGAATGGCCAGTAAACCCATGAAAGGTTGCTCTATATCA	SEQ ID NO. 233

	CTGGTCTTCAAAGAAATGCAAATTATAACTATAATGAAATACAA TTGCACAGAATGGCCACAATTAAAAAGACTGATAATACCAAGCA TTGGCAAAGATGTGGAGCAATAGAAACTCTCATAGATAGCTGGC AGAAATGTAAATGGTACAAACACGTTGGGAAACATTTTGGCATC TTTGATAAAGCTCAGCACACACTTAACATACAACCCAGAAATCC CATTCCAGTCAGGCATGGTGGCTTACGCCTATAATCCCAGTACT TTGGGAGGCTGAGGCAGGCGGATCACTTGAGCTCAGGTGTTCAA GACCAGACTGGGCAACATGGCGAGACACTGTCTCTACTAAAAAT ACAAAAAAAAAAAAAAAAAAAGCCAGACATGGTGGTAAGCACCT GTGGTCCCAGCTACTAGGGAGGCTGAGGTGGGAGAATTGCTTAA CCCTGGGGAGTGGAGGTTGCAGTGAGCTGAGATTGCACCACTGC ACTCCAGCCTGGGTGACAGAGCAAGACCCTGTCTCAAAAAAAGA AAAAAAGAAGAAGAAAAGAAGTCCCACTCCTGGATATTTACCCC CAAAAGAAAAATATGTAATTCCATAAAGACTTGTACAAAGATGT TCATAGCAGCTTTATTCATAGTAATCTCAAAACTTAAATGACCC AAATGTCTGTCAACAGGACAATGGGTAAATAC [A/T] TCATAGT CTGTTCATCCAATGGAATATTACTCAGCAGTAAAAAGGAATGTT ATAGTTGCATGCAGCAATGTGTATGAAGCTCATAAACCTCATGC TGAGTAAATGAAGCCAGACGCAAATGAGTTTACACTGTTTTACT CCATTTACATGAGATTTTAGAAAATACAAACTAATCTATAGTAA CAGAAATTAGATCTGTGGTTGCCTGGTGTCAAAGCTTGAGAGGC ACTCACTGCGAAGAAGTGTGAAGGGATGTCTTTTGGTTGTGAAA ATGTTCTATATCTTGAGTGTGGTGGAGGTTACATGGGTGGATAC ATTTGTCAACATTCATCAAACAGTACACTTAAAATGGGTGAATT TGTTATAAGTAAATTATGCTCCAATAAATTTGATTTATTTGTTG AAAAACTTGGTGTAAGGGGGAAGTGCCTAACCAATAGAAGACAC TCAAAAAATGTGTTGAAGGAAAAAAATCCTGTGAAATAAAGCAG GTAAGAGAAAATAAGAACTCAATATCATCCAAAATATAGATTAC AAATCCTAAATGAGATAATAGGAAATTAATCCCAGTGCTCTGTT TAAAGGCTCATACCTGTAATCCCAACACTTTGGGAGACTGAGGC AGGAGGATGGGTTGAGCCCAGGAGTTCAAGACCAGCCTGGTCAA CATAGGGAGAGCCTGTCTCTTCAAAACAAAAATTTAAAAATTAC CTGGGTGTAGTGGCACGTGCCTGTGCTCCCAGCTACTCCAGAGG CTGAGGCAGGAGGATAGCTTGAGCCCAGGAGTTCAAGCCTGCCC TGAGCCATAATCACTGCACCACACTCCAGCCTGGGCAACAGAAC AAGACCCTTCCTCAAAAAAGCAATAAAATAAAATAAAGAAATGC ACATGACTAACATAGGGTTTATTCCAGGAATGCAGGAATAGCCC AGTAGCAGAGAAAGCCTATTAAATAATTTATCACATTAATATAT CAAAAGATCAAACCATTTGATGCTA	
KCP_233655	TTTACTCCATTTACATGAGATTTTAGAAAATACAAACTAATCTA TAGTAACAGAAATTAGATCTGTGGTTGCCTGGTGTCAAAGCTTG AGAGGCACTCACTGCGAAGAAGTGTGAAGGGATGTCTTTTGGTT GTGAAAATGTTCTATATCTTGAGTGTGGTGGAGGTTACATGGGT GGATACATTTGTCAACATTCATCAAACAGTACACTTAAAATGGG TGAATTTGTTATAAGTAAATTATGCTCCAATAAATTTGATTTAT TTGTTGAAAAACTTGGTGTAAGGGGGAAGTGCCTAACCAATAGA AGACACTCAAAAAATGTGTTGAAGGAAAAAAATCCTGTGAAATA AAGCAGGTAAGAGAAAATAAGAACTCAATATCATCCAAAATATA GATTACAAATCCTAAATGAGATAATAGGAAATTAATCCCAGTGC TCTGTTTAAAGGCTCATACCTGTAATCCCAACACTTTGGGAGAC TGAGGCAGGAGGATGGGTTGAGCCCAGGAGTTCAAGACCAGCCT GGTCAACATAGGGAGAGCCTGTCTCTTCAAAACAAAAATTTAAA AATTACCTGGGTGTAGTGGCACGTGCCTGTGCTCCCAGCTACTC CAGAGGCTGAGGCAGGAGGATAGCTTGAGCCCAGGAGTTCAAGC CTGCCCTGAGCCATAATCACTGCACCACACTCCAGCCTGGGCAA CAGAACAAGACCCTTCCTCAAAAAAGCAATAAAATAAAATAAAG AAATGCACATGACTAACATAGGGTTTATTCCAGGAATGCAGGAA	SEQ ID NO. 234

	TAGCCCAGTAGCAGAGAAAGCCTATTAAATAATTTATCACATTA ATATATCAAAAGATCAAACCATTTGATGCTAAAATCACATTTGA TATAATTTACCATTTATTCATAATAATTTTCAGGATTCAATTAA TTAGGAATAAAATACTTCTTCAGCATAATAGAAAATACCCCAGC CTGGTACACAGCTTCATACTTTATGGTAACAC [A/G] CGGAGAT TCTCACTGAAGAAAAGATGAGGCAAGAAAAGATGATGAAGAAAA GATGAGGCAAGAAAAGATGATGTCTGCACACTGTCAGACATCAC CACTGTTTAACATTTCCTGAAAGCTCTTCAAACACAGTGAAACA GAAAAGGAAATGCGATCTAAATAGGAAAAATTACAACATTCCTT GTTAATGACATGATTTTCTATCTGAGAAAAAAGACAGCAAGAAA ATCAACTTAAAACAACTAGAACTTTTAAAAAGCTGGCAAAGTGA CTGGTAATAAAATACATATGCAAAAAGAAATTGTGTAGCCAATA TATCAGTTGTGACTAGCTAGAAAATTGTAATACAAATATTCTCA TTGTGATCACAATAAAATTTAAAGCACATGGGCATTTTTAAATA TCCATAATTTAGATGAAGAGAAAGAAAATTTTGATAAGTAGAGA AACATACCATCTTCTGAAAGGATGTATATTATAAAGATAGCAAT ATTATAATGACAGCAATTCTTCTCTAATTAAATTTATTTTATTT TGAATCAAAATGGAAGTGTTATTTGGGAAGGAAATTTGGCACAA TTGTTATAAAGTTACATTGGAAGATTAATCAGATGAAAATAGCA AAGATAATTTTCAAAAAGAAGAAAAATGGTGGGATTTGTTCTAC CAGATACTGAAATATATTATAAAGCTGAAACTATTAAAATATTA TAATATCAGAGAAGGAACAGGTAGATCAATGGAACAAAATAGAA ATCCCAGGTACAAATACCATCTTGGTTCATAATAAAGGGAGCAT ATTGAATAGAGAGGTAATGAATCATTAAATGATTCTTGGAAAAC TGGTTAACTATTTTGGCAATAAGTAAGTAAATATTCTTACTCGG TACCATAAACACAAAATCACTATAGATATGTACAGTTGCTTTTT AACTAAAAAAGAACTAAAAATCATATGTGAATATCTGATCAAAG AATGGAAAAAGCATAAAATCAAAGT	
KCP_237505	GCCTGTAGTCCCAGCTACTTGAGAGGCTGAGGCGGGAGGATCAC TTGAACCCGGGAGGTCGAGGCTGCAGTGACGGGGATTGTGCCAC TGCACTCCAGCCTGGGTGACAGAGCAAGAACCTGTCTCAAAAAA AAAAAAAAAGAAAAAAGAAAAAAAGAATGAGAAACTCATACAGA TTAGAAGAGACTAAGGAGACACAACAAATAAATGCAATGTAGAA TCATTGAAGGGAAAAAAATATTAGTTGAAAAGCTGAGATCCCGC CACTGCACTCCAGCCTGGGCCACAGAGCGAGACTCCGTCTCAAA AAAAAAAAAAAAAAAAAAAAAAAAAAAGAAAAGCTGATAAAATT TGAATAAGCCCTGTAGTTTAGTTAATAATAGTGAAGCCATGTTA ATTTCCTGGGTTTGGTCATTGTGCTCTGGTTATGCAAGTTGTTA ACATTAGAGGAGACTGAGTGAAAGGTATGCATGAACTCTCTGTA CTAATTTTGTAAATTT [C/T] CTGTAAGTCTAAAATTATTCATA ATATGCAAAAATTAAACAAAAAATAAAATAAAATAAGCACATGG AATGAGACTGTCCCCTGGGTCTCTGTAGAAACCAGGTCAAACAT CCCAAATGCTCTTTTACCCCCATTCTGAGTTGGGCCAGAATGGT CAGAATAATGGTTCCCAATGTACCTTGATAAACACGGAAACTCT CAGGACCGAGTCCTAAGGTTCTCTGATTCAATAGGTTTGGAGTG GACTTGAGAACTGATCTTTTTAATAAGGGCCTCAGTCTGTGGAA CTATTGGCCTCATGTGCCCTGTGGATAATCTTGGCTGTTGGTTC ATTTTTCTTAACTGAAAACAGTGGCAGAAACTATGGGGATTTTT AAATCTCTAGGCTAGAACATTAACTTTTTAAAAATTCAGAATAG TATTTTATTTGCCTCAAGCCTGTGAATGGGGATCCCACAAATCA CCCCCCACTGAAGACAATGCCCATAACAAGGTAACCT	SEQ ID NO. 235
KCP_15400	TTATGCAAGTTGTTAACATTAGAGGAGACTGAGTGAAAGGTATG CATGAACTCTCTGTACTAATTTTGTAAATTTTCTGTAAGTCTAA AATTATTCATAATATGCAAAAATTAAACAAAAAATAAAATAAAA TAAGCACATGGAATGAGACTGTCCCCTGGGTCTCTGTAGAAACC AGGTCAAACATCCCAAATGCTCTTTTACCCCCATTCTGAGTTGG GCCAGAATGGTCAGAATAATGGTTCCCAATGTACCTTGATAAAC	SEQ ID NO. 236

	ACGGAAACTCTCAGGACCGAGTCCTAAGGTTCTCTGATTCAATA GGTTTGGAGTGGACTTGAGAACTGATCTTTTTAATAAGGGCCTC AGTCTGTGGAACTATTGGCCTCATGTGCCCTGTGGATAATCTTG GCTGTTGGTTCATTTTTCTTAACTGAAAACAGTGGCAGAAACTA TGGGGATTTTTAAATCTCTAGGCTAGAACATTAACTTTTTAAAA ATTCAGAATAGTATTTTATTTGCCTCAAGCCTGTGAATGGGGAT CCCACAAATCACCCCCCACTGAAGACAATGCCCATAACAAGGTA ACCTACCCATGAGCTTCTGAGGGATTTAGGAATTGTCTACCATC TCCTCTCTAAGAAGGGCTCCCACAATATATCCCCTTCTGCTTGC TTCTAACTCCCTATCACCTGCTAAAGAAGGACCTCACCTTTTAA TCACTTTCATTGCCAAGGGGCACAAGGAGCCCCAAACTCTGTCA CCTAGGAAGAGCTTGACCTCATGGTTTCCACACTGTGTGCTTTT ATGTCCCTGCTCCAGGAGATGATGGACATTGTCAAAGCCATCTA TGACATGATGGGGAAATACACATATCCTGTGCTCAAAGAGGACA CTCCAAGGCAGCATGTGGACGTCTTCTTCCAGGTAAGTGCACAC ACCCTGCACATGAGCTGTAAGCCCAGCCTAGATCAAGTCAACCC ACGAGCATCTGAGCAAATGATTTGTGTCCAAC [C/T] CTGTACT AAGCATGGTTGGTAACAGAAAAGAATTATAAGATACATTGTCCT CAAGAAACAGATGATCTCCTTAAGCTGCAAGTGTACATGACAGA AGAGAACAAGAAAGTATATTATTAAACGCTAGTGGTATAGTATG AACTCTAAATCCATAAAAATTTGGGGATCAGGGTAAACACGAAA GACTTCATTAATTACAACTGTGGAGGTGTTAAGCATTTGTGTCT GGGAAGTAAGGGGAAATAAGATTGGAAACTAGGATAGGGCCAGA TTATGAGACCTTTAAATGGAAGAGTTTGGCCTTGCTCTGGTACA GGATGGGCAGCTAGTGCTGATCCTTGACTAAGGGAGTGGTATAA TCATTGGGGCATTTTAGGAAAAAATTAATCTAGCGGTGGAGTAT CAGAGAATATCAAGAGTTCACTCTAGTTCAACCTCCCACTTTGC AGATGGGAAAAGAGAGTCCTCTCTGGCCTTGTGCAAGTTTGTAC AGCAAGTAACAGGCCAGAATCAGAACCTCTTTTGCCCAGTGTTC TGCCAGATGGACAGGGTAGCAGGGAGTCTACAGAAGAAGCAGAA TAAGCCAGCAGTGAGGTGATGAGTGTCCAGAGCAAGTCTTTTGA TTTAAGGAAGCTCATGGGGCTCAAAGTGTTGTAATCAGGACCTA ATTGGAGTTGTCTGGCCAGTGAAAGACAACTCTCATTCTCAGGG CAAAGTTGGTTAATGAAATGAATGAAATGAGCTCCAGCTCGTTA CTCTGAGCTCCAGCAAGAAAGCAGGGGAGTAAGCTTTGGAATGG AGATCACCAGATTCTGTAAAGTGCTTTCTGTTATGTCTTTCAGA AAATGGACAAAAATAAAGATGGCATCGTAACTTTAGATGAATTT CTTGAATCATGTCAGGAGGTAAGGAGAGATCTCAGGGCACAATA ACTCTACATCTGGGAAAGGAAACCTGGGGCCTGGGGACCTGCAG AAGGAAGGTGATGAGAAACCTGCAC	
KCP_238591	TCTAACTCCCTATCACCTGCTAAAGAAGGACCTCACCTTTTAAT CACTTTCATTGCCAAGGGGCACAAGGAGCCCCAAACTCTGTCAC CTAGGAAGAGCTTGACCTCATGGTTTCCACACTGTGTGCTTTTA TGTCCCTGCTCCAGGAGATGATGGACATTGTCAAAGCCATCTAT GACATGATGGGGAAATACACATATCCTGTGCTCAAAGAGGACAC TCCAAGGCAGCATGTGGACGTCTTCTTCCAGGTAAGTGCACACA CCCTGCACATGAGCTGTAAGCCCAGCCTAGATCAAGTCAACCCA CGAGCATCTGAGCAAATGATTTGTGTCCAACCCTGTACTAAGCA TGGTTGGTAACAGAAAAGAATTATAAGATACATTGTCCTCAAGA AACAGATGATCTCCTTAAGCTGCAAGTGTACATGACAGAAGAGA ACAAGAAAGTATATTATTAAACGCTAGTGGTATAGTATGAACTC TAAATCCATAAAAATT [C/T] GGGGATCAGGGTAAACACGAAAG ACTTCATTAATTACAACTGTGGAGGTGTTAAGCATTTGTGTCTG GGAAGTAAGGGGAAATAAGATTGGAAACTAGGATAGGGCCAGAT TATGAGACCTTTAAATGGAAGAGTTTGGCCTTGCTCTGGTACAG GATGGGCAGCTAGTGCTGATCCTTGACTAAGGGAGTGGTATAAT CATTGGGGCATTTTAGGAAAAAATTAATCTAGCGGTGGAGTATC	SEQ ID NO. 237

	AGAGAATATCAAGAGTTCACTCTAGTTCAACCTCCCACTTTGCA GATGGGAAAAGAGAGTCCTCTCTGGCCTTGTGCAAGTTTGTACA GCAAGTAACAGGCCAGAATCAGAACCTCTTTTGCCCAGTGTTCT GCCAGATGGACAGGGTAGCAGGGAGTCTACAGAAGAAGCAGAAT AAGCCAGCAGTGAGGTGATGAGTGTCCAGAGCAAGTCTTTTGAT TTAAGGAAGCTCATGGGGCTCAAAGTGTTGTAATCAG	
KCP_16152	GGAAGAGCTTGACCTCATGGTTTCCACACTGTGTGCTTTTATGT CCCTGCTCCAGGAGATGATGGACATTGTCAAAGCCATCTATGAC ATGATGGGGAAATACACATATCCTGTGCTCAAAGAGGACACTCC AAGGCAGCATGTGGACGTCTTCTTCCAGGTAAGTGCACACACCC TGCACATGAGCTGTAAGCCCAGCCTAGATCAAGTCAACCCACGA GCATCTGAGCAAATGATTTGTGTCCAACCCTGTACTAAGCATGG TTGGTAACAGAAAAGAATTATAAGATACATTGTCCTCAAGAAAC AGATGATCTCCTTAAGCTGCAAGTGTACATGACAGAAGAGAACA AGAAAGTATATTATTAAACGCTAGTGGTATAGTATGAACTCTAA ATCCATAAAAATTTGGGGATCAGGGTAAACACGAAAGACTTCAT TAATTACAACTGTGGAGGTGTTAAGCATTTGTGTCTGGGAAGTA AGGGGAAATAAGATTGGAAACTAGGATAGGGCCAGATTATGAGA CCTTTAAATGGAAGAGTTTGGCCTTGCTCTGGTACAGGATGGGC AGCTAGTGCTGATCCTTGACTAAGGGAGTGGTATAATCATTGGG GCATTTTAGGAAAAAATTAATCTAGCGGTGGAGTATCAGAGAAT ATCAAGAGTTCACTCTAGTTCAACCTCCCACTTTGCAGATGGGA AAAGAGAGTCCTCTCTGGCCTTGTGCAAGTTTGTACAGCAAGTA ACAGGCCAGAATCAGAACCTCTTTTGCCCAGTGTTCTGCCAGAT GGACAGGGTAGCAGGGAGTCTACAGAAGAAGCAGAATAAGCCAG CAGTGAGGTGATGAGTGTCCAGAGCAAGTCTTTTGATTTAAGGA AGCTCATGGGGCTCAAAGTGTTGTAATCAGGACCTAATTGGAGT TGTCTGGCCAGTGAAAGACAACTCTCATTCTCAGGGCAAAGTTG GTTAATGAAATGAATGAAATGAGCTCCAGCTC[A/G]TTACTCT GAGCTCCAGCAAGAAAGCAGGGGAGTAAGCTTTGGAATGGAGAT CACCAGATTCTGTAAAGTGCTTTCTGTTATGTCTTTCAGAAAAT GGACAAAAATAAAGATGGCATCGTAACTTTAGATGAATTTCTTG AATCATGTCAGGAGGTAAGGAGAGATCTCAGGGCACAATAACTC TACATCTGGGAAAGGAAACCTGGGGCCTGGGGACCTGCAGAAGG AAGGTGATGAGAAACCTGCACATACCTGCAACCCCTCCCATCAG AGCCAACAACACCAGCAACAACTGTGAAGTCCACAGTTCCACTC CTCAACCTGACCTGCAGTTGGTCTTGGCTAAGCACAAGACTGAA CAGAGAGCCTAAGTAGGGGTCTGGGGGCATGTGAAAACTCAGAG GGGGTCTCTGTGAAAATAGACTTCCCGAGAGGGCAACACCATTA TTTTTTAGCCTGCCTCTGGCTTGATGACCCATTTCCCAGACTAC AAGGAAGCAGCTGGGGGGAAAAAAACCTACAATTGTGTGATTCT CAAACCACAGTGTGCATAAAAATTGCCTGGAATGATTCTGAAAA TGCATATTTCCAGGCCTCAATCCCAGAGACTCTAGATCTGGGTC ACTTTAACACAAATGTCCTGGACCAATGCTTCTAACACTTTAAT GTGTGAAACAATATCCTTGATGATTTTGTTAAAATGCAGATTCT AATTCCATAGGTCTGGGGTAGGGCCTGAGATGTTACTTTTCTCA CATTCTCCCCAGTCACACTGGTGATGCTGATCCTGGGAACACAA CTTTCATTAAGTCTAACCAATAGACCAGCCCCAGAGTCCACCAG AGACTGAACTGGAAATAATTGCTTCATCTACTTTTGAGAAATCC ATTTGTACCCCCACATTATTTTAGAAATGTTCAGAGTTACTCTG AGCTCCAGCCAAGAAGAATAGCAAATGTAAGAAAGCCGGGGAGA AGTTCCTAGCAGATACTGAGCCCCC	SEQ ID NO. 238
KCP_18069	TTGAAAGAGAGCGCTTTGGGGGGTTTTCTTACTGTATGTCTCTA TTGCATGTTCTGTATTTTACATTTTTCTATTATTTCTTCTCTGA GGTATAGTATTGAATGTAGAAAAATCCTCAAATGTTCGGTATTA AGCAATACACTTCTAATTCATGGTTCAGAGAAGAAAATATCTCG AATAAAAATAAAATAAAAATATGACTTATCAAAATTTGTAGGAT	SEQ ID NO. 239

	CTAAAGCAGTATTCCAGGAATGCAAGGTTGGTTTAACATTCAAT AATTGGTCAGTGTAATTAATCACATTAATAGAATAAAAGAGAA AAAATATAATCATTTCAGTGGATGTAATTGTTCAGAGCTTCTTA AAAGAAGCAACTCACTATTTTACTAGATGATTTGTTTCTTCTGA ATTCCTCTTTAAGGCTACAGGTGGTGCTTCTTACTTTGAACTGA TCACTTTCTAGGTCCCCACCCTTACTTCTTGTTTTTCATACCCT TGTAGAGTTTTCTCCA [C/T] ATAGGAAACCCATGCTTGACATT TGCTCACCAGAGTTACAGAGCTCTCAGGGAGGAGACTCAGAGTT CTAACCCTCTTGCCCTCCTTTTTTCCCAGGACGACAACATCATG AGGTCTCTCCAGCTGTTTCAAAATGTCATGTAACTGGTGACACT CAGCCATTCAGCTCTCAGAGACATTGTACTAAACAACCACCTTA ACACCCTGATCTGCCCTTGTTCTGATTTTACACACCAACTCTTG GGACAGAAACACCTTTTACACTTTGGAAGAATTCTCTGCTGAAG ACTTTCTATGGAACCCAGCATCATGTGGCTCAGTCTCTGATTGC CAACTCTTCCTCTTTCTTCTTCTTGAGAGAGACAAGATGAAATT TGAGTTTGTTTTGGAAGCATGCTCATCTCCTCACACTGCTGCCC TATGGAAGGTCCCTCTGCTTAAGCTTAAACAGTAGTGCACAAAA TATGCTGCTTACGTGCCCCCAGCCCACTGCCTCCAAG	
KCP_241527	ACTTTGAACTGATCACTTTCTAGGTCCCCACCCTTACTTCTTGT TTTTCATACCCTTGTAGAGTTTTCTCCATATAGGAAACCCATGC TTGACATTTGCTCACCAGAGTTACAGAGCTCTCAGGGAGGAGAC TCAGAGTTCTAACCCTCTTGCCCTCCTTTTTTCCCAGGACGACA ACATCATGAGGTCTCTCCAGCTGTTTCAAAATGTCATGTAACTG GTGACACTCAGCCATTCAGCTCTCAGAGACATTGTACTAAACAA CCACCTTAACACCCTGATCTGCCCTTGTTCTGATTTTACACACC AACTCTTGGGACAGAAACACCTTTTACACTTTGGAAGAATTCTC TGCTGAAGACTTTCTATGGAACCCAGCATCATGTGGCTCAGTCT CTGATTGCCAACTCTTCCTCTTTCTTCTTCTTGAGAGAGACAAG ATGAAATTTGAGTTTGTTTTGGAAGCATGCTCATCTCCTCACAC TGCTGCCCTATGGAAG [G/T] TCCCTCTGCTTAAGCTTAAACAG TAGTGCACAAAATATGCTGCTTACGTGCCCCCAGCCCACTGCCT CCAAGTCAGGCAGACCTTGGTGAATCTGGAAGCAAGAGGACCTG AGCCAGATGCACACCATCTCTGATGGCCTCCCAAACCAATGTGC CTGTTTCTCTTCCTTTGGTGGGAAGAATGAGAGTTATCCAGAAC AATTAGGATCTGTCATGACCAGATTGGGAGAGCCAGCACCTAAC ATATGTGGGATAGGACTGAATTATTAAGCATGATATTGTCTGAT GACCCAAACTGCCCATGTCATTTGTTTCCAGAAACGAGGACCAA TAATTCTCTCACACTGGCATTTGTGCTGGTAGTACAAGTCCTTT AATATGTCCAGGAAGGGAGCCATTGCCCAGTGGTCCATATCTCC ACCACATCCCCTGCTTGAGCCCAGCGCTGCATGTCCCTCCCAAG AAGTCCAGAATGCCTGCAAATTGCTGTAATTTTATAC	SEQ ID NO. 240
KCP_241804	CTGATCTGCCCTTGTTCTGATTTTACACACCAACTCTTGGGACA GAAACACCTTTTACACTTTGGAAGAATTCTCTGCTGAAGACTTT CTATGGAACCCAGCATCATGTGGCTCAGTCTCTGATTGCCAACT CTTCCTCTTTCTTCTTCTTGAGAGAGACAAGATGAAATTTGAGT TTGTTTTGGAAGCATGCTCATCTCCTCACACTGCTGCCCTATGG AAGGTCCCTCTGCTTAAGCTTAAACAGTAGTGCACAAAATATGC TGCTTACGTGCCCCCAGCCCACTGCCTCCAAGTCAGGCAGACCT TGGTGAATCTGGAAGCAAGAGGACCTGAGCCAGATGCACACCAT CTCTGATGGCCTCCCAAACCAATGTGCCTGTTTCTCTTCCTTTG GTGGGAAGAATGAGAGTTATCCAGAACAATTAGGATCTGTCATG ACCAGATTGGGAGAGCCAGCACCTAACATATGTGGGATAGGACT GAATTATTAAGCATGA [C/T] ATTGTCTGATGACCCAAACTGCC CATGTCATTTGTTTCCAGAAACGAGGACCAATAATTCTCTCACA CTGGCATTTGTGCTGGTAGTACAAGTCCTTTAATATGTCCAGGA AGGGAGCCATTGCCCAGTGGTCCATATCTCCACCACATCCCCTG CTTGAGCCCAGCGCTGCATGTCCCTCCCAAGAAGTCCAGAATGC	SEQ ID NO. 241

	CTGCAAATTGCTGTAATTTTATACCATGTTCTAACCAATAAACA GAACTATTTCTTACACTCTCAATCACTTCTTCATGACTCCGTTA GGTAAGAGAGGTAAGCTGTGAAAAGGGAAGGCTAGTCCATTCAT TTGACACCCAATTATTAGTGCAGTTGTCCCTCCATATGTGTGAA GGATCAGTCCCAGGACTCTCCATACCAAAATCTGCAGATACTCA AGTCCCACAGCTAGCCCTGAGGGACTCGTGTTTCAGAAAATTT GGCCTCCATATATGCAGGTTTCACATCCTATAAATAC	
KCP_1324	CCCAAGCTCAACCATTCCAATGCCATCTCCTCTGGTTCCAGATA AGATTGAAGATGAGCTGGAGATGACCATGGTTTGCCATCGGCCC GAGGGACTGGAGCAGCTCGAGGCCCAGACCAACTTCACCAAGAG GGAGCTGCAGGTCCTTTATCGAGGCTTCAAAAATGTAAGACCCG TGCACGCTCTGAAGGCCTGGGGGG	SEQ ID NO. 242
KCP_15204	TTGTCTACCATCTCCTCTCTAAGAAGGGCTCCCACAATATATCC CCTTCTGCTTGCTTCTAACTCCCTATCACCTGCTAAAGAAGGAC CTCACCTTTTAATCACTTTCATTGCCAAGGGGCACAAGGAGCCC CAAACTCTGTCACCTAGGAAGAGCTTGACCTCATGGTTTCCACA CTGTGTGCTTTTATGTCCCTGCTC	SEQ ID NO. 243
KCP_4957	ACCCTCAATACAGACTGTTCCTACAGTCCACGTCCTCAGCCACT AGACCATACGGCCACTGGGATGATAGACAGACCACTGCAGCCAT GGATAAGGCAAAAACAGGGCTGGCTGTGTTGATCTGTGTCTCTC AGAGCTCCATTCTTCCTCAAGGGGGCACCTTGCAAAAAAAAACA AAAAAATGGGGCAGGGTAGGGAAC	SEQ ID NO. 244
KCP_5011	GCCACTGGGATGATAGACAGACCACTGCAGCCATGGATAAGGCA AAAACAGGGCTGGCTGTGTTGATCTGTGTCTCTCAGAGCTCCAT TCTTCCTCAAGGGGGCACCTTGCAAAAAAAAACAAAAAAATGGG GCAGGGTAGGGAACTGAAGGCAGGAGCTCTTCACAGAGCATAGC CACATCCTCCAGGCAGACAAGAGG	SEQ ID NO. 245
KCP_5051	GGCAAAAACAGGGCTGGCTGTGTTGATCTGTGTCTCTCAGAGCT CCATTCTTCCTCAAGGGGGCACCTTGCAAAAAAAAACAAAAAAA TGGGGCAGGGTAGGGAACTGAAGGCAGGAGCTCTTCACAGAGCA TAGCCACATCCTCCAGGCAGACAAGAGGACGCAGGAGGCACCAT TCTGTGAGAGTATCACAGTCTGAC [C/T] CAAAGACACAGCTTC ACACTGTCTGATGGCTTGATGGTTAATGTCACTCTGCCTTTTCC CCTTCTCAGGACTTTGTAACCGCTCTGTCGATTTTATTGAGAGG AACTGTCCACGAGAAACTAAGGTGGACATTTAATTTGTATGACA TCAACAAGGACGGATACATAAACAAAGAGGTAAGTGAGCTGGGG CCAGGGGTGT	SEQ ID NO. 246
KCP_5202	GACAAGAGGACGCAGGAGGCACCATTCTGTGAGAGTATCACAGT CTGACCCAAAGACACAGCTTCACACTGTCTGATGGCTTGATGGT TAATGTCACTCTGCCTTTTCCCCTTCTCAGGACTTTGTAACCGC TCTGTCGATTTTATTGAGAGGAACTGTCCACGAGAAACTAAGGT GGACATTTAATTTGTATGACATCA [A/C] CAAGGACGGATACAT AAACAAAGAGGTAAGTGAGCTGGGGCCAGGGGTGTGAGAGGGCT CCAGTGAAGGTAACTAACCCAACAGAAAACAGCCCCAGGCATGA GGATAGCACTGTCTGAATGAGGCAGGCTCTGCTTTGGGGCTAAC AGAGCTGGTCCCTGGCAAAATAAAGAAGGCCTCCCTCATTGCCC TACCCTGCCC	SEQ ID NO. 247
KCP_e1a_249924	CCACCAGGGTCCCTTCCAACTCACGGAGCCTATGGTACTGAATG GCAGCCAGGTTTTTATGGAGCAATAGCTGGACTTCACATTTGC ATAATGCCTTGCAGTTTCACTGTTAAGAGTACTGCATTGTATTC TAATTATATGAATCTCGGTCATTCCTTTATGACATTTCTGAGGA ATACTATCTCAATCAAGAAAAGCCCTAATTGCACTCCTCTCCTA TCCCGGTGAGAGAGCACAGACTCGTGCCTGCTCCGCAGGGGTGG AGGCTGGAATTCAGTAGTCTGAGTCGGGGATGCCTGGAGCAGGA GGTGGTCAGGGGCATTGTCCTTTCCAAGTCAGGAAGGCAGACAG CACCTGCTGTTGGTGCCAAGGTTACTGGACAGGCTGCGAGGGCT CTGTCTGTCTGTCCGATGTTCACAGGCCAGCTCCCCGGAGGCTC	SEQ ID NO. 248

	AGCACTCAGCCCAGCTTCTCCGAGATGCAAACCAGGCCACTCTG AGGCTGCCTACAAACTTTCTGCTGAGTGCCGACAGCTGCTTCCT GCTCTGCGGGGAGTTCTTCCAGATCCTGATCAAGGCACAGAGAA TTGATCTATCAGATTAACCAGGAAGGAAAGAGTGGGAGAGCGAG TGTGGGAGGCTGTGGGGCTGAGTGTTTTCTGCGTAGCAGTCCCC TCCCTTCTGACTTGAGTATTAATTGCTACATTACCGCTGCCATG TAAGAAAGACAGTCAGCAAAGCCTGGGAGAGCTCCAGCTCCTCC CTCCCTGCTCTGCTCAACTTCACTCTCCTCCTCGGTTCCCTTGG AGTACCTTGTGCCCCGGCAGTGCTGTCCCGGCCCTGGCATCCTG AGGTCCTCCCGTGGTGAGGACTTAAGTGGACA [C/G] CAGGAGT GGGTGGAGAGAGGGAGGGAGAGTTTGCCCTGCAGGCTCTCTGGA TGCAGAAGCCAGACTCGCTGCAGAGGCAGCTGTGCTGTTCCCGG AGCCTGGCTTCAGGGGTGCATCCGTCACTCAGGGTTCATTCACC CAGGCAGGCTCCAAGTTCCTGGGGTGCACAAGGTGGGCACTGTC CCTTCTGGGTGCTGACAGCAGAGCCTGGCTCCCCTCCGCCACCA TGAGCGGCTGCTCCAAAAGATGCAAGCTTGGGTTCGTGAAATTT GCCCAGACCATCTTTAAGCTCATCACTGGGACCCTCAGCAAAGG TATGGAAACTGGCCTTGACCCTTGCTTTCTGTCTTGATATGGCC TGGCTGGTCGCATTGCCTCGGTGTGGTGAGCGTGACCATTCTGG TGCACCCAGGTCTTGGAAAAAGCTGGGGAAATTGGTGGCTGGGA TTCGAGGTTGCTGACAACCTGCGTCCTGGCTTTGAGTAGGCGGG CACCCAGCCAGGGAACTCAGCTGGCTGTAATTGCCTGGAACTTT GGAAATGGAGTTGGTGGTGTGTGGCTGATACGTTATGGGCGGGC AGAGGGATAGAACCCTTTCCAGAGCATTGGAAGTGGCTTAGCGT GACTGGAGTTTCAAGAAGTTATCCATGGAAGGTTGTATTTTGTT GATAAAAGAGAGATTTGATGCAGTGGGTTGTGAGTAATTCTGCA GAACAGAGACGCTTGAGGGGGCCAGTGGGAGGTGGTGATGGCC GGCATCTGCTTTGCCCTGGTGGCTTCAGAAACCGGATCAGCTCT GCACCTCAAGTGCCAAGAGCCTCCTCTCATAGGGTTCCAGCGTC TCGTGCTTCTGGGGCTTCATTCATCGTTCTGCTTTCTTGGATCC CTGTCCCTCCACATTTCATGCCTA	
KCP_e1a_ 250027	CAAGGCACAGAGAATTGATCTATCAGATTAACCAGGAAGGAAAG AGTGGGAGAGCGAGTGTGGGAGGCTGTGGGGCTGAGTGTTTTCT GCGTAGCAGTCCCCTCCCTTCTGACTTGAGTATTAATTGCTACA TTACCGCTGCCATGTAAGAAAGACAGTCAGCAAAGCCTGGGAGA GCTCCAGCTCCTCCCTCCCTGCTCTGCTCAACTTCACTCTCCTC CTCGGTTCCCTTGGAGTACCTTGTGCCCCGGCAGTGCTGTCCCG GCCCTGGCATCCTGAGGTCCTCCCGTGGTGAGGACTTAAGTGGA CAGCAGGAGTGGGTGGAGAGAGGGAGGGAGAGTTTGCCCTGCAG GCTCTCTGGATGCAGAAGCCAGACTCGCTGCAGAGGCAGCTGTG CTGTTCCCGGAGCCTGG [C/T] TTCAGGGGTGCATCCGTCACTC AGGGTTCATTCACCCAGGCAGGCTCCAAGTTCCTGGGGTGCACA AGGTGGGCACTGTCCCTTCTGGGTGCTGACAGCAGAGCCTGGCT CCCCTCCGCCACCATGAGCGGCTGCTCCAAAAGATGCAAGCTTG GGTTCGTGAAATTTGCCCAGACCATCTTTAAGCTCATCACTGGG ACCCTCAGCAAAGGTATGGAAACTGGCCTTGACCCTTGCTTTCT GTCTTGATATGGCCTGGCTGGTCGCATTGCCTCGGTGTGGTGAG CGTGACCATTCTGGTGCACCCAGGTCTTGGAAAAAGCTGGGGAA ATTGGTGGCTGGGATTCGAGGTTGCTGACAACCTGCGTCCTGGC TTTGAGTAGGCGGGCACCCAGCCAGGGAACTCAGCTGGCTGTAA	SEQ ID NO. 249
KCP_e1a_ 250049	ACAGAGAATTGATCTATCAGATTAACCAGGAAGGAAAGAGTGGG AGAGCGAGTGTGGGAGGCTGTGGGGCTGAGTGTTTTCTGCGTAG CAGTCCCCTCCCTTCTGACTTGAGTATTAATTGCTACATTACCG CTGCCATGTAAGAAAGACAGTCAGCAAAGCCTGGGAGAGCTCCA GCTCCTCCCTCCCTGCTCTGCTCAACTTCACTCTCCTCCTCGGT TCCCTTGGAGTACCTTGTGCCCCGGCAGTGCTGTCCCGGCCCTG GCATCCTGAGGTCCTCCCGTGGTGAGGACTTAAGTGGACAGCAG	SEQ ID NO. 250

	GAGTGGGTGGAGAGAGGGAGGGAGAGTTTGCCCTGCAGGCTCTC TGGATGCAGAAGCCAGACTCGCTGCAGAGGCAGCTGTGCTGTTC CCGGAGCCTGGCTTCAGGGGTGCATCCGTCACT [A/C] AGGGTT CATTCACCCAGGCAGGCTCCAAGTTCCTGGGGTGCACAAGGTGG GCACTGTCCCTTCTGGGTGCTGACAGCAGAGCCTGGCTCCCCTC CGCCACCATGAGCGGCTGCTCCAAAAGATGCAAGCTTGGGTTCG TGAAATTTGCCCAGACCATCTTTAAGCTCATCACTGGGACCCTC AGCAAAGGTATGGAAACTGGCCTTGACCCTTGCTTTCTGTCTTG ATATGGCCTGGCTGGTCGCATTGCCTCGGTGTGGTGAGCGTGAC CATTCTGGTGCACCCAGGTCTTGGAAAAAGCTGGGGAAATTGGT GGCTGGGATTCGAGGTTGCTGACAACCTGCGTCCTGGCTTTGAG TAGGCGGGCACCCAGCCAGGGAACTCAGCTGGCTGTAATTGCCT GGAACTTTGGAAATGGAGTTGGTG	
KCP_UTR1 _382206	TGGCCCACCTTCAGGGTCATGAGGATTCATAAACCCTATTCTGC GAAGTGCCTCCAGGAATCATCAAGGGAGCTAGGGCAGCTCTGAG TCTCCACCAGGCCCACCCTCCGCCTCTCAGGGCTGAGCTTCACT TCCCTTCCCAAAGGGGCCAGGGAGAGGGGCTGCTGATGACATGA TCTCAGAGGAAGGCCAAGGCCTCCAGGCTGCCTCTGGGCCTGGC ACAGGAAGGAGGAGGAGAAAATAGGGAGCCCAAGGAAAGATCAA CCCAGCCCAGCCCAAGGACCCCCAGCCCCAGCCCCAGCCCCAGC TGGGCTCAAACTAATTGAAAACAGACTGGAAAAGGCTGCTTTTG CCCTTCCTCTAGACTCAGCATCATCAAGACTGGAGGGACAGAGC ATTTGAATCATCAGACGCTGGGCCAGA [C/T] GTCACCCCACGC GTTTTCTCATTTTATCGTCCTAAGAAGCCCAGAAGGTGCGTAAA ATGGCCTGTCCCAAACAGATGAGGACATTACCTTTCTCCTCTTC CTCCTCCTCCTTCTTCTTCTTCTTTTTGCTTCATTTTTCTT TCATTTTTTCCCCCAGATGTTGCATTTCAGAGAGGCTGAGCGTG TTGACTAAGGTCACACAGCTACAAACATCAGGGACCTGCGAAAA AGCTCTGTTCCCTGGTGACAGGTGTTCTGTGATCCTAACACAGC CGGAGGTGGGGACAACGTCCTTGCAGTAACAAAGGCCCTGTTGC TCAACTCAGTGGACATCAGGCCCTGTTTTCATTCATTAGCAGGT CAGGGATTCCAGTGTCACCTGTGCCATGTATTCCAGCTGATCTA CCTGCAAGCCTCTACTCCCCATTTTCCCAGCAGCAGCCGCAGAC ACCACCCAACTGG	SEQ ID NO. 251
KCP_UTR1 _382272	GGGTCATGAGGATTCATAAACCCTATTCTGCGAAGTGCCTCCAG GAATCATCAAGGGAGCTAGGGCAGCTCTGAGTCTCCACCAGGCC CACCCTCCGCCTCTCAGGGCTGAGCTTCACTTCCCTTCCCAAAG GGGCCAGGGAGAGGGGCTGCTGATGACATGATCTCAGAGGAAGG CCAAGGCCTCCAGGCTGCCTCTGGGCCTGGCACAGGAAGGAGGA GGAGAAAATAGGGAGCCCAAGGAAAGATCAACCCAGCCCAGCCC AAGGACCCCCAGCCCCAGCCCCAGCCCCAGCTGGGCTCAAACTA ATTGAAAACAGACTGGAAAAGGCTGCTTTTGCCCTTCCTCTAGA CTCAGCATCATCAAGACTGGAGGGACAGAGCATTTGAATCATCA GACGCTGGGCCAGACGTCACCCCACGCGTTTTCTCATTTTATCG TCCTAAGAAGCCCAGAAGGTGCGTAAAATGGCCTGT [A/C] CCA AACAGATGAGGACATTACCTTTCTCCTCTTCCTCCTCCTCCTTC TTCTTCTTCTTCTTTTTGCTTCATTTTTCTTTCATTTTTTCCCC CAGATGTTGCATTTCAGAGAGGCTGAGCGTGTTGACTAAGGTCA CACAGCTACAAACATCAGGGACCTGCGAAAAAGCTCTGTTCCCT GGTGACAGGTGTTCTGTGATCCTAACACAGCCGGAGGTGGGGAC AACGTCCTTGCAGTAACAAAGGCCCTGTTGCTCAACTCAGTGGA CATCAGGCCCTGTTTTCATTCATTAGCAGGTCAGGGATTCCAGT GTCACCTGTGCCATGTATTCCAGCTGATCTACCTGCAAGCCTCT ACTCCCCATTTTCCCAGCAGCAGCCGCAGACACCACCCAACTGG CAGAAATTTCAAACAAGGGGTTCTGCCTTGCACTCCGGTGCAAG GGTTGGGCACGTGGACTCACAT	SEQ ID NO. 252
KCP_3UTR	CACAAAACAAATCCGGGACTTTAAGCCTGATCTGCTTGACCTGA	SEQ ID

2_395068	AACTCATATCTACTTCCCTGCCCTCTGAAGATCTATATGTCCTA TGTCATCACTTCACTGTTCACACAAGGTGATACCTGGCTTCTCC AAGCACCTGCTACCCTGAACTTACTGCACCACTCTTTCCTTCCT AGCCTGAATGCAATTTGCAATGAGGAGATGATTTGATTTTCTTC AGCCCTAGACCTCCAGCTTCCTGAGAGCAGGTACTCTTGCCTCT TCTTGCTCATTATTGATCCATATATTTAGAATAGCGCCTGGCAG GTAGATGGTGCTTAATAAATATTCATTGAATAAATGAATGAATG AATGATCCAATGAGCCCCAAAGCAAATAACAATAAAGGACATTT GCAGAGTGCTCTACAGAGAGACAAGTGCTTTCCCTTT [A/G] CT TTATCTTACCCCATTCTCACAACAATCCCCTGACATGATTGGGT TCATGTTTCACAGATGAGGAGGCTAACGGCCAGGTGTACATACC AGGGGACATGGGACTGGGTTCATATGAGCTCAGGGGTAAATGAT GACACCCTTTCCCCTGCCCTGAAGGATCTCAGTTTGAGTATTTG TAGCACACTTAGGATGTTCTGGGCCAGGCTGAGTGGCGGTGGAT GGGGGCGGTGGAGGTGGGGTATGCAAAGCAGGAAACTCGGCCTT TGCTTTCTAAAAGCTCCCAGTCTATTTGAGGCCAGACTTATGCA TGCAGAACATTTGGGAAATGGTACAAGACAGCAGCAAGCATAGT GCTGAATTGCACATAATCAGGTGCCAACTGCATTCCCTTCCTTA ACTAATCT	NO. 253
KCP_3UTR 3_398480	AACTTTCTCCTCAGCAAAGAGCTCTCCTCTGTTCCCTGAATCCT GGATATCCCACTGGGTCCTCTAGTGACCCCAAGCTTCAGCCTCG CATGCCCTCTTCTCGAACAGAGAAGGCAGGAGGGAAGCAGGGAC CAGCCCCTGCTCCATCTTCCAGGATTCCAGGCCTCCCTGGCCTG GACAAGCCCTGAGCTGGCAGTTAGGAGAGCAGAGGTTGTGAATC TGGTGGGACCCCCAGCAGGTCTTTCTGGCTCAGTGCCCTCATCT GTGAGCAGGGGTTCCCCAGGAGACCACGACAGAGGCCTGGAACC CAAGTTCTAATCCCACATCCTGGCTGGGCAACTTCAGGCAAATT TCTAACACAAGGTAAGCCTCAATTTCTCTCTGGGGTAATGATCA GGCACCTGCTTAATTCACAGGGGTTTGGTGGGCATCA [C/T] GT GGACAATGTGGTTGCACAGCAGTGGGCAATGCAAAGGAAAGGAA GTATGTTAGTAAGTGCCCCTCCCCTGTTGCACAAAACAGGACAC ATGCTGGGATTGCAGAAAAGCAATAAATGCTGCACAGGTGAAGA AAACTATTCAAGGACCCTGGCCAAGTCACAGGCTACCTGTGGCC CTGAGGGGACAGCTCATGGGTTGGCATTAGGGGAAGCAGCTCTC AAGGGGCCTGTATCCTGGGGATTCAACTCTGTGCCTATGTGGCA TTGAGCCTGTGTGAATGTGGTGACTGTCATGCTGTTTTGCTGTG TGTGCGTCTGCATGCCTGTGTGTTTGTGTGTCTCTCCACCTTCG TGGGGGGCAACTGTAGGTGTATTATGAGCCTTGGGTCTGTCTGT GTGTACAATAGCAATGTCTGTGCGGACTTAAGGACCTGCGCCCA TATGTTTGTGGGACTTTC	SEQ ID NO. 254
KCP_3UTR 3_398605	CAGAGAAGGCAGGAGGGAAGCAGGGACCAGCCCCTGCTCCATCT TCCAGGATTCCAGGCCTCCCTGGCCTGGACAAGCCCTGAGCTGG CAGTTAGGAGAGCAGAGGTTGTGAATCTGGTGGGACCCCCAGCA GGTCTTTCTGGCTCAGTGCCCTCATCTGTGAGCAGGGGTTCCCC AGGAGACCACGACAGAGGCCTGGAACCCAAGTTCTAATCCCACA TCCTGGCTGGGCAACTTCAGGCAAATTTCTAACACAAGGTAAGC CTCAATTTCTCTCTGGGGTAATGATCAGGCACCTGCTTAATTCA CAGGGGTTTGGTGGGCATCACGTGGACAATGTGGTTGCACAGCA GTGGGCAATGCAAAGGAAAGGAAGTATGTTAGTAAGTGCCCCTC CCCTGTTGCACAAAACAGGACACATGCTGGGATTGCAGAAAAGC AATAAATGCTGCA [C/T] AGGTGAAGAAAACTATTCAAGGACCC TGGCCAAGTCACAGGCTACCTGTGGCCCTGAGGGGACAGCTCAT GGGTTGGCATTAGGGGAAGCAGCTCTCAAGGGGCCTGTATCCTG GGGATTCAACTCTGTGCCTATGTGGCATTGAGCCTGTGTGAATG TGGTGACTGTCATGCTGTTTTGCTGTGTGTGCGTCTGCATGCCT GTGTGTTTGTGTGTCTCTCCACCTTCGTGGGGGGCAACTGTAGG TGTATTATGAGCCTTGGGTCTGTCTGTGTGTACAATAGCAATGT	SEQ ID NO. 255

	CTGTGCGGACTTAAGGACCTGCGCCCATATGTTTGTGGGACTTT CTGGGCATGCATGCTTGTTTATGAGGCCATACATCCGGGTATTC TGTGAACTGCTAGCATGGTGTGTATCTGTGTGGCAGACAGAAAA TGGCTGGGTGGGA	
KCP_e1b_ 399912	ATCTCAGCACTTTGGGAGGCCAAGGCGGGTGGATCACCTGAGGT CAGGAGTTCAAGCCCAGCCAGCCCAACATGGCGAAACCCCGTCT CTATTAAAAAATACAAAAAAATTTAGCTGGGCCTAGTGGTGGGC GCCTGTAATCCCAGCTACTCCGGAGGCTGAGGCAGGAGAATCGC TTGAATCTGGGAGGCAGAGGTTGCAGTGAGCAGAGATCGCACCA CTGCACTCCAGCCTGGGCAACAGAGCGAGACTCCGTCTCAAAAA AAAAAAAAAAAGAAAAAGAAAAATGAGAGTGTAAGGGCCCAGAG GGGCTGAGGGCTCCTTTCTCCTCCCCAACTCCCTGTCACTAGAA GGTGGGCCCTGCCATAGGAGGATTCTGCAGAACCCTCAAGGACC CGCGGAGCAGGACGGCACCTTCTTCCCATGACCACCCATTTGGA TGTGTTTTTCACCCCTTTCTGGGTGGGGCAGACTTTCCCCCTCC CCATGAGTTCAGGCAG [G/T] GGGTTAAATAAGATTTCCCTTGA AGTCGAATGAAATCACAATGCACCACACACAGGGACACACACAC ACACACACGCACGCACGCACATCACACACACACACACACACACA CACACACACACACACACATACACACACACAGTCTCCCTGGGGCC AATCTACTGCCCCCTGAACCTCACCCATCAGCCAGGTGCCTGGC CCCGGGTCTGTCTCTTAGGGTTACATGCTCCCGGGGCTCCCGCA CATACCCCGGCAGATGAGGGTGCGCAGGGGTGAGGGCGCAGGGC TGGGCGTCCCCCGCCCCCACCGTGCAGCCCTCGCCCCCGCCCCG CCCCTCCGTAGTTGCCCGCCCGCCGCCCCCTCCGCCGCCCCCTC CGCCGCTCCGACTCTCGCCCCGAGCGCTGGCAGCAGGCAGCAGG CAGCAGGCGGGCGCGCTGTGGCTCCGCGCCGCGCGGTCCGGGCT CTGTTCATTCATGATTGGTACTCGGCCCTCCGAGACC	SEQ ID NO. 256
rs102685	AGCACTCCTGGGGCTCATTGTTAAGTTTATAAAACTCAGAGCTG ATGAGTTGTGTGCACTGTGTGGGTCTGAGTGGGCTTATGACTCC CCTCCAAGCCTGGCTGTAAGAATCTAAGACTTAAAGCTGAAGGA CCAAATGGGACTTTCTGTCCCATCCCCTCTCTGCTCCATGCAAG CACCAA [C/T] GTGGATTTTTGCCCCTAATTATATTAGGGAACG CTGTCAATCAAAAAGATGATGTTAAACTCATCCAGAACAAACCA AACCATGTTTAAGGGGAAGAAAAGATTACATCTTCAAATGCCAG CATGCCATCATTAATACAATGTCTAATGTAGTCAATATAGTTCA GGCAACATTGAAAATGAACCACTGCAAATACTAGGAATACAATT TCAAGAGGAAGCACAACATTCTGTGTTTCTATGCACACAGTCCT GTAAATTATTTGCAGCTCAAGTATGTCATGTTCTTTTAAATTTT CCCCTGGGTACAGCTTGAACAACTTCCTACAAGTGTTGATATGT CATATTCTCATTATCATTTAGTTCAAAATTACCATGATTTAATT ACCATGAGGTTGCTTTTTTGATACATGAGTTACTTAGAAATTGA ATTAggctaggcatggtggcttccacctataatcctagcacttt ggaaggccaaggcaggaggattgcttgagtttgaggccagtcta ggcaatatagtgagacctcatctccccaaaagtacaaaaaaact agccaggcatggggacacatgcctatagttccagctactcaaag gctgaggtggggaggattgctttgagcctggg	SEQ ID NO. 257
rs905808	GCCAGCTATCCCCAGAGACATCACAGGAGAAGGAGCAGAAGCTG GAACATCATCCGGGAGCTGGACTAGAACGTCCCGGGAAACTTCA GCCTGGCTTCTGCTTTGTCCCGAAAACCCAGGGGCTCCAGCTCC AGGGCTGTGTCTTAGAATGAGGCAGTTTATCTGTTCAGGGCTTC TCTTAGTTTTTAATCCCAATAGGACACA [C/T] GTTGTATTAAA AAGCCATGCGAGATGGAAGAAGGAAATTGAATGAAATTTGAGGG CAGGTAGGAGCAGAGACAATAAATAATTCAGCAGTGAAGGAAGC AGAAAAAAGATTGCACTCATTTCGCCCTTCAACAATTATACTAA ACACCTGCTCTGGGCCACAGAAGGGCCAGATCCCATTCCTGTGC TCAGGAAGCCCACAGGCCGGCAGGGAGAGGCTGGTTGGAATGTG TGCTTTGCACTGTAACGGAGGCATCGAGCATGGTAAGGGACTGG	SEQ ID NO. 258

	CGGTGACTGCTGCCTGCGGACGTCGAGACAGGGGCCTTTGAAGA GGCAGGACCTGTCTGGAGTCTTACCTGGGCCTTGGCCTGGCAAT GGGG	

Table11. The Build 33 location of SNPs and microsatellites employed for the first-pass association analysis across KChIP1.

Start (B33)	Marker	Public Alias	deCODE alias	Variation
169788696	DG5S47			
169794522	DG5S1592			
169843903	DG5S119			
169869845	rs933656	rs933656	DG00AAFCS	A/G
169869955	rs2339091	rs2339091	DG00AAFCI	G/T
169961410	DG5S13			
169964087	rs905808	rs905808	DG00AAFCG	C/T
170006645	rs883849	rs883849	DG00AAFCK, DG00AAIOG	A/G
170015858	DG5S123			
170037283	rs2135046	rs2135046	DG00AAFCJ, DG00AAIOH	C/T
170041996	DG5S124			
170056955	rs2339139	rs2339139	DG00AAFCR	A/G
170064881	rs329468	rs329468	DG00AAFCH	A/G
170070041	rs50057	rs50057	DG00AAFCF, DG00AAIOI	A/G
170070735	rs102685	rs102685	DG00AAFCE, DG00AAIOJ	C/T
170073252	rs50364	rs50364	DG00AAFCD	A/G
170081291	KCP_1152		SG05S176	C/T
170081473	KCP_1333		SG05S921	A/G
170082788	KCP_2649		SG05S923	C/T
170085115	KCP_4976		DG00AAGHK, DG00AAHUT, DG00AAINX	C/T
170085217	KCP_5077		DG00AAINZ	A/T
170095540	KCP_15400		SG05S946	C/T
170096291	KCP_16152	rs486818	SG05S948	A/G
170098209	KCP_18069	rs1363712	SG05S189	C/T
170105556	D5S625			

Table 12. The Build 33 location of SNPs found through sequencing across KChIP1(from exon 1b to exon 8).

Build 33 Pos	Project Pos	DECODE ALIAS	SEQ PROJECT ALIAS	PUBLIC ALIAS	SNP
169866787	9677	DG00AAHAP	KCP_9677		C/G
169867465	10355	SG05S229	KCP_10355		A/T
169867556	10446	DG00AAHAR	KCP_10446		C/G
169871957	14847	SG05S485	KCP_14847	rs486768	A/T
169872129	15019	SG05S1298	KCP_15019	rs4867973	A/G
169872417	15307	SG05S437	KCP_15307		A/C
169872421	15311	SG05S438	KCP_15311		A/T
169872435	15325	SG05S439	KCP_15325		C/G
169872949	15839	SG05S440	KCP_15839		A/G
169873539	16429	SG05S486	KCP_16429		C/T
169873680	16570	SG05S487	KCP_16570		A/G
169875123	18013	SG05S488	KCP_18013		A/T
169875568	18458	SG05S1002	KCP_18458		A/G
169876302	19192	SG05S489	KCP_19192		A/G
169878365	21255	SG05S490	KCP_21255		G/T
169878734	21624	SG05S491	KCP_21624	rs486769	A/G
169879678	22568	SG05S492	KCP_22568		A/C
169879717	22607	SG05S493	KCP_22607		C/T
169881496	24386	SG05S494	KCP_24386		A/G
169882681	25571	SG05S495	KCP_25571		A/C
169883265	26155	SG05S496	KCP_26155		A/G
169883333	26223	SG05S497	KCP_26223		C/G
169883413	26303	SG05S498	KCP_26303		A/G
169883465	26355	SG05S1171	KCP_26355		C/G
169883518	26408	SG05S499	KCP_26408		A/T
169883738	26628	SG05S500	KCP_26628		A/G
169883811	26701	SG05S501	KCP_26701		A/G
169884084	26974	SG05S1172	KCP_26974		C/T
169884145	27035	SG05S502	KCP_27035		G/T
169884439	27329	SG05S503	KCP_27329		C/T
169884682	27572	SG05S504	KCP_27572		A/G

169884707	27597	DG00AAJHT	KCP_27597		A/G
169884973	27863	SG05S505	KCP_27863		A/G
169885005	27895	SG05S506	KCP_27895		A/G
169888453	31343	SG05S507	KCP_31343	rs4867975	C/T
169889433	32323	SG05S60	KCP_32323		C/T
169889680	32570	SG05S508	KCP_32570		A/G
169890025	32915	SG05S509	KCP_32915		A/G
169890055	32945	SG05S1173	KCP_32945		A/G
169890089	32979	SG05S1174	KCP_32979		A/C
169890291	33181	SG05S510	KCP_33181		A/G
169892122	35012	SG05S1175	KCP_35012		A/C
169892332	35222	SG05S511	KCP_35222		A/G
169892524	35414	SG05S61	KCP_35414		G/T
169892619	35509	SG05S512	KCP_35509		C/T
169892687	35577	SG05S513	KCP_35577		G/T
169893157	36047	SG05S514	KCP_36047		C/T
169893169	36059	SG05S515	KCP_36059		C/T
169893871	36761	SG05S516	KCP_36761		A/C
169894061	36951	SG05S517	KCP_36951		A/G
169894358	37248	SG05S518	KCP_37248		C/G
169895507	38397	SG05S1176	KCP_38397		C/T
169895699	38589	SG05S953	KCP_38589		A/C
169896322	39212	SG05S519	KCP_39212		G/T
169896357	39247	SG05S520	KCP_39247		A/G
169896369	39259	SG05S521	KCP_39259		A/G
169896451	39341	SG05S1177	KCP_39341		A/G
169896647	39537	SG05S522	KCP_39537		C/T
169896750	39640	SG05S523	KCP_39640		A/T
169896914	39804	SG05S524	KCP_39804		A/G
169897484	40374	SG05S525	KCP_40374		C/T
169897594	40484	SG05S526	KCP_40484		A/G
169897621	40511	SG05S527	KCP_40511		C/T
169897856	40746	SG05S528	KCP_40746		C/T
169898205	41095	SG05S529	KCP_41095		C/T
169898252	41142	SG05S530	KCP_41142		C/T
169898371	41261	SG05S531	KCP_41261		A/G
169899446	42336	SG05S532	KCP_42336		A/G
169899693	42583	SG05S533	KCP_42583		A/G
169900156	43046	SG05S534	KCP_43046		A/G

169900425	43315	SG05S1178	KCP_43315		C/G
169900629	43519	SG05S535	KCP_43519		C/T
169902212	45102	SG05S536	KCP_45102	rs211261	A/G
169902400	45290	SG05S537	KCP_45290		G/T
169903206	46096	SG05S538	KCP_46096		C/T
169903615	46505	SG05S539	KCP_46505		C/T
169903676	46566	SG05S540	KCP_46566		A/C
169903766	46656	SG05S541	KCP_46656		A/C
169904530	47420	SG05S542	KCP_47420		C/T
169904757	47647	SG05S543	KCP_47647		A/G
169906262	49152	SG05S1179	KCP_49152		A/G
169906576	49466	SG05S544	KCP_49466		A/G
169906846	49736	SG05S545	KCP_49736		A/T
169907866	50756	SG05S1180	KCP_50756		A/G
169908937	51827	SG05S1181	KCP_51827		C/T
169909190	52080	SG05S1182	KCP_52080		C/T
169910099	52989	SG05S546	KCP_52989		A/G
169910133	53023	SG05S547	KCP_53023		C/T
169911784	54674	SG05S548	KCP_54674		A/C
169911823	54713	SG05S549	KCP_54713		A/C
169913086	55976	SG05S1183	KCP_55976		A/G
169913415	56305	SG05S62	KCP_56305		A/G
169913670	56560	SG05S954	KCP_56560		C/T
169913988	56878	SG05S550	KCP_56878		C/G
169914731	57621	SG05S551	KCP_57621		A/G
169914887	57777	SG05S552	KCP_57777		A/G
169915597	58487	SG05S553	KCP_58487		A/G
169917130	60020	SG05S554	KCP_60020		C/T
169917579	60469	SG05S555	KCP_60469		A/G
169917813	60703	SG05S556	KCP_60703		A/G
169919206	62096	SG05S557	KCP_62096		A/G
169919909	62799	SG05S233	KCP_62799		C/T
169921008	63898	SG05S558	KCP_63898		A/G
169921407	64297	SG05S559	KCP_64297		A/G
169921917	64807	SG05S560	KCP_64807		G/T
169922010	64900	SG05S1184	KCP_64900		A/G
169922309	65199	SG05S955	KCP_65199		A/G
169922397	65287	SG05S561	KCP_65287		G/T
169923449	66339	SG05S562	KCP_66339		A/G

169923611	66501	SG05S563	KCP_66501		A/G
169924005	66895	SG05S564	KCP_66895		A/G
169925422	68312	SG05S956	KCP_68312		A/C
169926039	68929	SG05S565	KCP_68929		C/T
169926454	69344	SG05S566	KCP_69344		A/G
169926756	69646	SG05S567	KCP_69646		C/T
169927013	69903	SG05S568	KCP_69903		A/G
169927893	70783	SG05S569	KCP_70783		C/T
169928063	70953	SG05S570	KCP_70953		A/T
169928076	70966	SG05S571	KCP_70966		A/C
169928444	71334	SG05S572	KCP_71334		C/T
169928522	71412	SG05S573	KCP_71412		A/T
169928555	71445	SG05S1185	KCP_71445		C/T
169928665	71555	SG05S1186	KCP_71555		C/T
169928700	71590	SG05S1187	KCP_71590		C/T
169929635	72525	SG05S574	KCP_72525	rs4269297	A/G
169929849	72739	SG05S575	KCP_72739		C/G
169930171	73061	SG05S576	KCP_73061	rs4867613	C/T
169930506	73396	SG05S577	KCP_73396		A/T
169930538	73428	SG05S578	KCP_73428	rs4867978	A/G
169930644	73534	SG05S579	KCP_73534	rs4867979	C/T
169931073	73963	SG05S580	KCP_73963		C/G
169931425	74315	SG05S581	KCP_74315		A/G
169931663	74553	SG05S582	KCP_74553		G/T
169931670	74560	SG05S583	KCP_74560		C/T
169932137	75027	SG05S584	KCP_75027		C/T
169932696	75586	SG05S585	KCP_75586		A/C
169932998	75888	SG05S586	KCP_75888		C/T
169933181	76071	SG05S587	KCP_76071	rs386758	A/G
169933212	76102	SG05S588	KCP_76102	rs386759	C/T
169933256	76146	SG05S589	KCP_76146		A/G
169933389	76279	SG05S1188	KCP_76279	rs4368746	C/T
169933420	76310	SG05S590	KCP_76310		C/T
169933699	76589	SG05S591	KCP_76589		C/T
169933756	76646	SG05S592	KCP_76646		C/T
169934348	77238	SG05S593	KCP_77238		G/T
169934429	77319	SG05S594	KCP_77319		C/G
169934556	77446	SG05S595	KCP_77446		C/T
169934663	77553	SG05S596	KCP_77553		C/T

169934751	77641	SG05S597	KCP_77641	rs4242157	A/G
169934936	77826	SG05S598	KCP_77826		C/G
169934949	77839	SG05S599	KCP_77839		A/G
169935134	78024	SG05S600	KCP_78024	rs4867981	A/G
169935240	78130	SG05S601	KCP_78130	rs4867614	C/T
169935254	78144	SG05S602	KCP_78144		A/C
169935713	78603	SG05S603	KCP_78603		C/T
169935892	78782	SG05S604	KCP_78782		A/G
169935939	78829	SG05S605	KCP_78829		A/G
169935989	78879	SG05S606	KCP_78879		C/T
169936272	79162	SG05S607	KCP_79162		C/T
169936275	79165	SG05S608	KCP_79165		C/T
169936329	79219	SG05S609	KCP_79219		G/T
169936495	79385	SG05S610	KCP_79385		C/T
169936910	79800	SG05S611	KCP_79800		C/G
169937029	79919	SG05S1189	KCP_79919		A/G
169937270	80160	SG05S612	KCP_80160		A/G
169937896	80786	SG05S613	KCP_80786		A/G
169938126	81016	SG05S614	KCP_81016		C/T
169938400	81290	SG05S615	KCP_81290		A/G
169938894	81784	SG05S1190	KCP_81784		A/G
169939578	82468	SG05S957	KCP_82468	rs4242158	A/G
169940311	83201	SG05S616	KCP_83201		C/T
169940995	83885	SG05S617	KCP_83885		A/G
169941106	83996	SG05S618	KCP_83996	rs4867615	A/G
169941897	84787	SG05S1191	KCP_84787		A/T
169942667	85557	SG05S619	KCP_85557		A/G
169942775	85665	SG05S620	KCP_85665		C/T
169942903	85793	SG05S958	KCP_85793		C/T
169943046	85936	SG05S621	KCP_85936		A/G
169943817	86707	SG05S622	KCP_86707		A/T
169944237	87127	SG05S623	KCP_87127		C/G
169945487	88377	SG05S624	KCP_88377		C/T
169945857	88747	SG05S625	KCP_88747		A/T
169945886	88776	SG05S626	KCP_88776		C/T
169945923	88813	SG05S627	KCP_88813		A/G
169946380	89270	SG05S628	KCP_89270		A/G
169946491	89381	SG05S629	KCP_89381	rs4867983	A/G
169947228	90118	SG05S630	KCP_90118		A/G

169947236	90126	SG05S631	KCP_90126		G/T
169947285	90175	SG05S632	KCP_90175		C/T
169947471	90361	SG05S633	KCP_90361		C/G
169947529	90419	SG05S634	KCP_90419		C/T
169947661	90551	SG05S635	KCP_90551		A/G
169947834	90724	SG05S636	KCP_90724		A/G
169948187	91077	SG05S637	KCP_91077		A/G
169948683	91573	SG05S1192	KCP_91573		A/G
169948703	91593	SG05S1193	KCP_91593		G/T
169948722	91612	SG05S1194	KCP_91612		A/G
169948755	91645	SG05S1195	KCP_91645		C/T
169948788	91678	SG05S1196	KCP_91678		A/G
169948798	91688	SG05S1197	KCP_91688		C/T
169948977	91867	SG05S638	KCP_91867		C/T
169949063	91953	SG05S639	KCP_91953		C/T
169949229	92119	SG05S640	KCP_92119		C/T
169949277	92167	SG05S641	KCP_92167		A/T
169949352	92242	SG05S642	KCP_92242		A/G
169949354	92244	SG05S643	KCP_92244	rs4867984	A/G
169949449	92339	SG05S644	KCP_92339		C/T
169950146	93036	SG05S63	KCP_93036		A/G
169950148	93038	SG05S645	KCP_93038		A/G
169950333	93223	SG05S646	KCP_93223	rs4867985	C/T
169950655	93545	SG05S64	KCP_93545		G/T
169950703	93593	SG05S1198	KCP_93593		C/G
169950754	93644	SG05S654	KCP_93644		G/T
169950844	93734	SG05S655	KCP_93734		C/T
169950855	93745	SG05S656	KCP_93745		G/T
169950892	93782	SG05S1199	KCP_93782		C/G
169950990	93880	SG05S657	KCP_93880		C/T
169951245	94135	SG05S1200	KCP_94135		A/C
169951290	94180	SG05S1201	KCP_94180		A/G
169951422	94312	SG05S658	KCP_94312		A/T
169951577	94467	SG05S659	KCP_94467		A/G
169951689	94579	SG05S660	KCP_94579		A/G
169951702	94592	SG05S661	KCP_94592		A/G
169951831	94721	SG05S662	KCP_94721		C/G
169951838	94728	SG05S663	KCP_94728		A/G
169951848	94738	SG05S664	KCP_94738		C/T

169951855	94745	SG05S665	KCP_94745		A/G
169952144	95034	SG05S1202	KCP_95034		A/G
169952209	95099	SG05S666	KCP_95099		A/C
169952705	95595	SG05S667	KCP_95595		A/G
169952838	95728	SG05S670	KCP_95728		A/G
169952962	95852	SG05S671	KCP_95852		A/G
169953175	96065	SG05S672	KCP_96065		C/G
169953185	96075	SG05S673	KCP_96075	rs43546	A/G
169953207	96097	SG05S674	KCP_96097	rs4374772	C/G
169953297	96187	SG05S675	KCP_96187		A/G
169953327	96217	SG05S676	KCP_96217		A/G
169953334	96224	SG05S677	KCP_96224		A/G
169953426	96316	SG05S678	KCP_96316		A/G
169953728	96618	SG05S1203	KCP_96618		C/G
169953902	96792	SG05S679	KCP_96792	rs4867987	C/T
169954134	97024	SG05S680	KCP_97024	rs4867988	C/T
169954165	97055	SG05S1204	KCP_97055	rs486798	C/T
169954260	97150	SG05S1205	KCP_97150		A/G
169954800	97690	SG05S681	KCP_97690		A/T
169954954	97844	DG00AAJIA	KCP_97844	rs222438	A/T
169955450	98340	SG05S682	KCP_98340		C/T
169956638	99528	SG05S683	KCP_99528		A/C
169956932	99822	SG05S684	KCP_99822		C/T
169957089	99979	SG05S685	KCP_99979		A/G
169957538	100428	SG05S1206	KCP_100428		G/T
169958211	101101	SG05S1207	KCP_101101	rs449521	A/G
169958651	101541	SG05S1208	KCP_101541		A/G
169958784	101674	SG05S686	KCP_101674		A/C
169959085	101975	SG05S687	KCP_101975		A/G
169959172	102062	SG05S1209	KCP_102062		A/T
169959537	102427	SG05S688	KCP_102427		A/G
169959561	102451	SG05S1210	KCP_102451		C/T
169959860	102750	SG05S1211	KCP_102750		C/T
169959992	102882	DG00AAJIB	KCP_102882		C/T
169961135	104025	SG05S689	KCP_104025	rs486799	A/G
169961268	104158	SG05S690	KCP_104158		G/T
169961404	104294	SG05S691	KCP_104294	rs4867991	A/G
169961971	104861	SG05S692	KCP_104861		A/G
169962144	105034	SG05S693	KCP_105034		A/G

169962410	105300	SG05S694	KCP_105300	rs4242159	A/T
169962429	105319	SG05S695	KCP_105319	rs4428429	C/G
169962889	105779	SG05S696	KCP_105779		A/G
169962929	105819	SG05S697	KCP_105819		C/T
169963467	106357	SG05S698	KCP_106357	rs236561	A/G
169963592	106482	SG05S699	KCP_106482		C/T
169963741	106631	SG05S700	KCP_106631		A/G
169963761	106651	SG05S701	KCP_106651		A/G
169963827	106717	SG05S702	KCP_106717		A/T
169964021	106911	SG05S703	KCP_106911	rs9587	C/G
169964087	106977	SG05S1212	KCP_106977	rs9588	C/T
169964112	107002	SG05S1213	KCP_107002	rs9589	C/T
169964368	107258	SG05S988	KCP_107258	rs95811	A/G
169964490	107380	DG00AAJIC	KCP_107380		A/G
169964862	107752	SG05S705	KCP_107752	rs95812	A/T
169964998	107888	SG05S706	KCP_107888		A/T
169965204	108094	SG05S707	KCP_108094		C/T
169965210	108100	SG05S708	KCP_108100		C/T
169965293	108183	SG05S709	KCP_108183		C/T
169965384	108274	SG05S710	KCP_108274		C/T
169965778	108668	SG05S1214	KCP_108668		C/T
169965813	108703	SG05S230	KCP_108703		G/T
169965814	108704	SG05S711	KCP_108704		A/G
169965989	108879	SG05S712	KCP_108879		A/T
169966345	109235	SG05S713	KCP_109235		C/G
169966790	109680	SG05S714	KCP_109680		A/C
169966813	109703	SG05S715	KCP_109703		A/G
169966833	109723	SG05S716	KCP_109723		A/G
169966856	109746	SG05S718	KCP_109746	rs95813	A/G
169967196	110086	SG05S719	KCP_110086		C/T
169967509	110399	SG05S720	KCP_110399		C/G
169968134	111024	SG05S721	KCP_111024		A/C
169968258	111148	SG05S722	KCP_111148		C/T
169968588	111478	SG05S723	KCP_111478	rs289191	C/G
169968602	111492	SG05S724	KCP_111492		A/G
169968614	111504	SG05S725	KCP_111504		C/G
169969010	111900	SG05S726	KCP_111900		A/G
169969185	112075	SG05S727	KCP_112075		A/G
169969769	112659	SG05S728	KCP_112659	rs4867994	C/T

169970341	113231	SG05S729	KCP_113231		A/G
169970367	113257	SG05S730	KCP_113257	rs4867616	A/G
169970440	113330	SG05S733	KCP_113330		A/G
169971048	113938	SG05S734	KCP_113938		A/G
169971464	114354	SG05S736	KCP_114354		A/G
169971531	114421	SG05S1215	KCP_114421		C/T
169971568	114458	SG05S737	KCP_114458	rs2879337	C/T
169971621	114511	SG05S738	KCP_114511		C/T
169972209	115099	SG05S740	KCP_115099	rs1553537	A/G
169972598	115488	SG05S741	KCP_115488		C/G
169973254	116144	SG05S742	KCP_116144	rs113922	C/T
169973325	116215	SG05S743	KCP_116215		A/G
169973369	116259	SG05S744	KCP_116259		A/G
169973465	116355	SG05S745	KCP_116355	rs289192	A/G
169974479	117369	SG05S746	KCP_117369	rs8719	A/T
169974926	117816	SG05S747	KCP_117816	rs1553538	C/T
169976065	118955	SG05S1216	KCP_118955		C/T
169977940	120830	SG05S748	KCP_120830	rs95819	C/T
169978197	121087	SG05S749	KCP_121087		C/T
169978247	121137	SG05S192	KCP_121137		A/G
169978339	121229	SG05S193	KCP_121229		C/T
169978427	121317	SG05S1217	KCP_121317		C/T
169980304	123194	SG05S751	KCP_123194		A/G
169980403	123293	SG05S752	KCP_123293		A/G
169980481	123371	SG05S1218	KCP_123371		A/G
169980664	123554	SG05S753	KCP_123554		C/T
169981035	123925	SG05S1219	KCP_123925		A/G
169981067	123957	SG05S754	KCP_123957		A/G
169981628	124518	SG05S755	KCP_124518		C/T
169981632	124522	SG05S756	KCP_124522		G/T
169981987	124877	SG05S194	KCP_124877	rs4146511	C/T
169982473	125363	SG05S757	KCP_125363	rs222436	A/T
169982868	125758	SG05S758	KCP_125758		C/T
169983196	126086	SG05S195	KCP_126086		A/G
169983318	126208	DG00AAJHA	KCP_126208		T/C
169983565	126455	SG05S1220	KCP_126455		C/G
169983591	126481	SG05S759	KCP_126481	rs2221441	C/G
169983692	126582	SG05S760	KCP_126582		A/G
169985824	128714	SG05S1221	KCP_128714		A/G

169985916	128806	SG05S151	KCP_128806		A/G
169985985	128875	SG05S761	KCP_128875		C/T
169986162	129052	SG05S763	KCP_129052	rs4867617	C/G
169986174	129064	SG05S762	KCP_129064		C/G
169986189	129079	SG05S764	KCP_129079	rs4867618	C/T
169986203	129093	SG05S152	KCP_129093	rs4867995	C/G
169986237	129127	SG05S480	KCP_129127	rs4867619	A/G
169986334	129224	SG05S765	KCP_129224	rs486762	G/T
169986478	129368	SG05S766	KCP_129368		C/G
169986579	129469	SG05S181	KCP_129469		A/G
169986800	129690	SG05S182	KCP_129690	rs4867996	G/T
169986957	129847	SG05S767	KCP_129847		A/G
169986984	129874	SG05S985	KCP_129874	rs4867997	A/C
169986999	129889	SG05S986	KCP_129889	rs4867999	A/G
169987419	130309	DG00AAJHB	KCP_130309		A/G
169987667	130557	SG05S196	KCP_130557	rs95822	C/G
169988155	131045	SG05S768	KCP_131045		A/G
169988354	131244	SG05S197	KCP_131244	rs95824	A/G
169988368	131258	SG05S769	KCP_131258	rs95825	C/T
169988581	131471	SG05S770	KCP_131471	rs95826	A/G
169988714	131604	SG05S1222	KCP_131604		A/G
169988812	131702	SG05S771	KCP_131702	rs95827	C/T
169988905	131795	SG05S65	KCP_131795	rs48681	C/T
169988964	131854	SG05S153	KCP_131854		G/T
169989037	131927	SG05S772	KCP_131927		A/G
169989257	132147	SG05S773	KCP_132147		C/T
169989533	132423	SG05S774	KCP_132423		A/G
169989704	132594	SG05S775	KCP_132594	rs48682	G/T
169989739	132629	SG05S776	KCP_132629		A/G
169989787	132677	SG05S154	KCP_132677		A/G
169990284	133174	SG05S777	KCP_133174		C/T
169990366	133256	SG05S1223	KCP_133256		A/G
169990548	133438	SG05S778	KCP_133438	rs4867621	A/G
169990840	133730	SG05S779	KCP_133730		C/T
169990962	133852	SG05S780	KCP_133852		A/G
169991155	134045	SG05S198	KCP_134045		C/T
169991415	134305	SG05S199	KCP_134305		C/T
169991521	134411	SG05S781	KCP_134411		C/T
169991729	134619	SG05S1224	KCP_134619		A/C

169991939	134829	SG05S782	KCP_134829		C/T
169992076	134966	SG05S783	KCP_134966		A/G
169992155	135045	SG05S784	KCP_135045		A/G
169992628	135518	SG05S200	KCP_135518	rs48683	G/T
169992821	135711	SG05S785	KCP_135711		G/T
169993032	135922	SG05S786	KCP_135922		A/G
169993096	135986	SG05S183	KCP_135986		A/G
169993146	136036	SG05S481	KCP_136036		A/C
169993585	136475	SG05S787	KCP_136475		C/T
169994082	136972	SG05S201	KCP_136972	rs48684	A/G
169994770	137660	SG05S202	KCP_137660		A/G
169995924	138814	SG05S788	KCP_138814		C/T
169997343	140233	SG05S789	KCP_140233		C/T
169997640	140530	SG05S1225	KCP_140530		A/G
169998201	141091	SG05S1226	KCP_141091		A/G
170000256	143146	SG05S1227	KCP_143146	rs95361	C/T
170000611	143501	SG05S1228	KCP_143501		C/T
170000722	143612	SG05S66	KCP_143612	rs4867622	A/G
170000869	143759	SG05S790	KCP_143759		C/T
170000983	143873	SG05S1229	KCP_143873		C/T
170001571	144461	SG05S1230	KCP_144461		C/T
170001578	144468	SG05S1299	KCP_144468	rs93185	C/T
170002070	144960	SG05S203	KCP_144960	rs2279873	C/T
170002435	145325	SG05S791	KCP_145325		C/T
170002801	145691	SG05S1231	KCP_145691		A/G
170003438	146328	SG05S792	KCP_146328		A/G
170003572	146462	SG05S793	KCP_146462		G/T
170003856	146746	SG05S482	KCP_146746		C/T
170003940	146830	SG05S1232	KCP_146830		C/T
170004075	146965	SG05S794	KCP_146965		C/T
170004199	147089	SG05S1233	KCP_147089		C/G
170004733	147623	SG05S204	KCP_147623	rs2292146	C/T
170005151	148041	SG05S795	KCP_148041		C/T
170006326	149216	SG05S205	KCP_149216		A/G
170006485	149375	SG05S796	KCP_149375	rs883848	G/T
170006645	149535	SG05S206	KCP_149535	rs883849	A/G
170006910	149800	SG05S1234	KCP_149800		A/G
170007023	149913	SG05S797	KCP_149913	rs4867623	C/T
170007516	150406	SG05S798	KCP_150406	rs48685	G/T

170007640	150530	SG05S987	KCP_150530		C/T
170007808	150698	SG05S799	KCP_150698		G/T
170007921	150811	SG05S155	KCP_150811		A/G
170008215	151105	SG05S800	KCP_151105		G/T
170008937	151827	SG05S801	KCP_151827	rs449672	A/G
170009218	152108	SG05S1235	KCP_152108		A/G
170009587	152477	SG05S802	KCP_152477		C/T
170009592	152482	SG05S803	KCP_152482		A/C
170010385	153275	SG05S1236	KCP_153275		C/T
170010518	153408	SG05S1237	KCP_153408		C/T
170010943	153833	SG05S804	KCP_153833		C/T
170011041	153931	DG00AAJHC	KCP_153931	rs2879338	A/G
170011269	154159	SG05S805	KCP_154159		A/G
170011475	154365	SG05S1238	KCP_154365		A/G
170011963	154853	SG05S806	KCP_154853		C/T
170012367	155257	SG05S807	KCP_155257		C/G
170013726	156616	SG05S808	KCP_156616		C/T
170013842	156732	SG05S207	KCP_156732	rs924876	A/T
170015154	158044	SG05S809	KCP_158044		A/G
170015582	158472	SG05S810	KCP_158472		C/T
170015603	158493	SG05S811	KCP_158493		A/G
170015680	158570	SG05S812	KCP_158570		C/T
170015727	158617	SG05S67	KCP_158617	rs236559	C/T
170016200	159090	SG05S813	KCP_159090		A/G
170016255	159145	SG05S814	KCP_159145		A/G
170016259	159149	SG05S815	KCP_159149		C/T
170016791	159681	SG05S1239	KCP_159681		A/G
170016798	159688	SG05S1240	KCP_159688		A/G
170017255	160145	SG05S208	KCP_160145		A/G
170017524	160414	SG05S816	KCP_160414		G/T
170018297	161187	SG05S817	KCP_161187		A/G
170018356	161246	SG05S818	KCP_161246		C/G
170018549	161439	SG05S819	KCP_161439		A/G
170018573	161463	SG05S820	KCP_161463		C/T
170019258	162148	SG05S821	KCP_162148		C/T
170019314	162204	SG05S1241	KCP_162204		A/C
170019379	162269	SG05S822	KCP_162269		A/T
170019414	162304	SG05S823	KCP_162304		C/G
170019958	162848	SG05S824	KCP_162848		C/G

170020197	163087	SG05S825	KCP_163087		C/G
170020606	163496	SG05S826	KCP_163496		A/G
170020870	163760	SG05S827	KCP_163760		A/G
170021444	164334	SG05S1242	KCP_164334		A/G
170022007	164897	SG05S209	KCP_164897		A/G
170022125	165015	SG05S828	KCP_165015		G/T
170022343	165233	SG05S1243	KCP_165233		C/T
170022545	165435	SG05S1244	KCP_165435		C/T
170023275	166165	SG05S829	KCP_166165		A/G
170024034	166924	SG05S1245	KCP_166924	rs4867624	C/T
170024668	167558	SG05S830	KCP_167558		A/G
170025753	168643	SG05S1246	KCP_168643		A/G
170025970	168860	SG05S1247	KCP_168860	rs222439	C/G
170026021	168911	SG05S1248	KCP_168911		A/G
170026162	169052	SG05S1249	KCP_169052		A/G
170026344	169234	SG05S156	KCP_169234		A/G
170028032	170922	SG05S1297	KCP_170922	rs48688	A/C
170028055	170945	SG05S831	KCP_170945		C/G
170028163	171053	SG05S1250	KCP_171053	rs48689	A/G
170028303	171193	SG05S1300	KCP_171193	rs48681	G/T
170028752	171642	SG05S1251	KCP_171642		G/T
170028987	171877	SG05S832	KCP_171877		A/G
170030482	173372	SG05S833	KCP_173372		A/G
170030815	173705	SG05S834	KCP_173705		C/T
170030958	173848	SG05S210	KCP_173848		A/G
170030986	173876	SG05S1252	KCP_173876		C/T
170031092	173982	SG05S157	KCP_173982		A/C
170031149	174039	SG05S835	KCP_174039		C/T
170031150	174040	SG05S836	KCP_174040		A/G
170031353	174243	DG00AAJHF	KCP_174243		A/G
170031709	174599	SG05S837	KCP_174599		C/T
170031812	174702	SG05S838	KCP_174702		C/T
170031962	174852	SG05S839	KCP_174852		A/G
170031972	174862	SG05S840	KCP_174862	rs46285	G/T
170032216	175106	SG05S158	KCP_175106	rs233995	C/G
170032280	175170	SG05S211	KCP_175170		A/G
170032361	175251	SG05S841	KCP_175251		C/T
170032362	175252	DG00AAJHG	KCP_175252		A/G
170032610	175500	SG05S842	KCP_175500		A/G

170032814	175704	SG05S843	KCP_175704		A/G
170033021	175911	SG05S844	KCP_175911		A/G
170033923	176813	SG05S845	KCP_176813		A/G
170033946	176836	DG00AAJHH	KCP_176836		A/G
170034620	177510	SG05S184	KCP_177510	rs486811	A/C
170034720	177610	SG05S1253	KCP_177610		G/T
170034980	177870	SG05S846	KCP_177870		G/T
170035009	177899	SG05S847	KCP_177899	rs486812	C/T
170036929	179819	SG05S848	KCP_179819		C/T
170037010	179900	SG05S1254	KCP_179900		G/T
170037283	180173	SG05S159	KCP_180173	rs213546	C/T
170037347	180237	SG05S212	KCP_180237	rs213547	C/G
170038967	181857	SG05S1255	KCP_181857		C/T
170039237	182127	SG05S1256	KCP_182127		C/T
170039419	182309	SG05S849	KCP_182309		A/T
170041190	184080	SG05S160	KCP_184080	rs2292147	C/G
170041385	184275	SG05S964	KCP_184275		A/G
170042689	185579	DG00AAJDX	KCP_185579		C/A
170043158	186048	SG05S213	KCP_186048		A/G
170043789	186679	SG05S161	KCP_186679		C/G
170043953	186843	SG05S850	KCP_186843		A/C
170043997	186887	SG05S965	KCP_186887		C/T
170044226	187116	DG00AAJDY	KCP_187116		A/G
170044277	187167	SG05S851	KCP_187167		C/G
170044368	187258	SG05S852	KCP_187258		G/T
170044661	187551	SG05S853	KCP_187551		A/G
170044798	187688	DG00AAJDZ	KCP_187688		T/A
170044904	187794	SG05S966	KCP_187794		C/T
170045075	187965	SG05S967	KCP_187965		C/T
170046043	188933	SG05S968	KCP_188933		C/T
170046441	189331	SG05S214	KCP_189331		A/G
170047120	190010	SG05S854	KCP_190010	rs2221442	A/G
170047129	190019	SG05S855	KCP_190019		C/G
170048070	190960	SG05S856	KCP_190960		C/G
170048074	190964	SG05S857	KCP_190964		C/T
170048090	190980	SG05S858	KCP_190980		C/G
170048315	191205	SG05S859	KCP_191205	rs486815	C/T
170048733	191623	SG05S860	KCP_191623		A/G
170049238	192128	SG05S990	KCP_192128		C/T

170049852	192742	DG00AAJEB	KCP_192742	rs1973529	T/C
170050303	193193	DG00AAJEC	KCP_193193		G/A
170051066	193956	SG05S163	KCP_193956	rs22244	C/T
170051438	194328	SG05S861	KCP_194328		A/T
170051462	194352	SG05S862	KCP_194352		A/G
170051726	194616	DG00AAJEE	KCP_194616	rs23656	T/C
170051899	194789	SG05S970	KCP_194789		C/T
170052012	194902	SG05S863	KCP_194902		A/G
170052171	195061	SG05S971	KCP_195061		G/T
170052988	195878	SG05S864	KCP_195878		C/T
170053658	196548	DG00AAJEF	KCP_196548		A/G
170053669	196559	SG05S865	KCP_196559		A/G
170053840	196730	SG05S866	KCP_196730		G/T
170053939	196829	SG05S867	KCP_196829		C/G
170054581	197471	SG05S972	KCP_197471		A/G
170054620	197510	SG05S973	KCP_197510		C/T
170054788	197678	DG00AAJEG	KCP_197678	rs96284	T/C
170054803	197693	SG05S884	KCP_197693		A/G
170054885	197775	DG00AAJEH	KCP_197775		C/T
170055781	198671	DG00AAJEI	KCP_198671		A/G
170055957	198847	SG05S974	KCP_198847		A/G
170056043	198933	DG00AAJEJ	KCP_198933		G/A
170056137	199027	SG05S975	KCP_199027		A/G
170056475	199365	DG00AAJEK	KCP_199365		A/G
170056516	199406	SG05S164	KCP_199406		A/T
170056578	199468	SG05S1257	KCP_199468		C/T
170057283	200173	SG05S165	KCP_200173		C/G
170057351	200241	DG00AAJEL	KCP_200241		A/G
170057605	200495	SG05S976	KCP_200495		A/G
170057933	200823	SG05S991	KCP_200823		A/C
170058193	201083	SG05S992	KCP_201083	rs4464713	C/T
170058699	201589	SG05S885	KCP_201589		C/T
170059095	201985	DG00AAJEM	KCP_201985		G/A
170059177	202067	DG00AAJEN	KCP_202067	rs222144	A/G
170059203	202093	SG05S977	KCP_202093		A/C
170059905	202795	DG00AAJEO	KCP_202795	rs875184	C/T
170060219	203109	SG05S1258	KCP_203109		A/G
170060292	203182	SG05S978	KCP_203182		A/G
170060393	203283	SG05S979	KCP_203283	rs95818	A/G

170061018	203908	SG05S980	KCP_203908	rs95817	C/T
170061292	204182	SG05S981	KCP_204182	rs872435	G/T
170061352	204242	SG05S166	KCP_204242		C/T
170061419	204309	SG05S982	KCP_204309		A/G
170061618	204508	SG05S983	KCP_204508	rs872436	A/G
170061670	204560	SG05S1259	KCP_204560		A/G
170061727	204617	SG05S984	KCP_204617		C/T
170061799	204689	SG05S1260	KCP_204689	rs95816	G/T
170061809	204699	SG05S1261	KCP_204699		A/T
170061845	204735	SG05S1262	KCP_204735	rs95815	C/T
170062696	205586	SG05S886	KCP_205586	rs329466	C/T
170062747	205637	SG05S887	KCP_205637		A/C
170062756	205646	SG05S888	KCP_205646	rs329467	C/T
170062777	205667	SG05S889	KCP_205667		A/G
170062940	205830	SG05S167	KCP_205830		C/T
170062950	205840	SG05S890	KCP_205840		A/G
170063305	206195	SG05S891	KCP_206195		C/G
170063313	206203	SG05S892	KCP_206203		C/T
170063377	206267	SG05S168	KCP_206267		A/G
170063732	206622	SG05S893	KCP_206622		A/G
170063817	206707	SG05S894	KCP_206707		C/T
170063983	206873	SG05S1263	KCP_206873		A/T
170064013	206903	SG05S1264	KCP_206903		C/G
170064648	207538	SG05S895	KCP_207538		C/T
170064760	207650	SG05S969	KCP_207650		A/G
170064771	207661	SG05S169	KCP_207661		C/G
170064881	207771	SG05S896	KCP_207771	rs329468	A/G
170065075	207965	SG05S170	KCP_207965		C/T
170065694	208584	SG05S171	KCP_208584		A/G
170065711	208601	SG05S232	KCP_208601	rs329469	A/C
170065715	208605	SG05S897	KCP_208605		A/G
170065740	208630	SG05S172	KCP_208630		C/T
170065834	208724	SG05S1265	KCP_208724		C/T
170066123	209013	SG05S1266	KCP_209013		C/T
170066260	209150	SG05S1267	KCP_209150		A/G
170067967	210857	SG05S898	KCP_210857	rs2194162	A/G
170068018	210908	SG05S899	KCP_210908		C/G
170068420	211310	SG05S900	KCP_211310		A/G
170068510	211400	SG05S901	KCP_211400	rs41348	A/G

170068614	211504	SG05S902	KCP_211504		A/G
170068635	211525	SG05S173	KCP_211525		A/G
170068731	211621	SG05S903	KCP_211621		A/G
170068759	211649	SG05S1268	KCP_211649		G/T
170068960	211850	SG05S185	KCP_211850	rs32947	C/T
170069885	212775	SG05S186	KCP_212775	rs434973	A/G
170070003	212893	SG05S1269	KCP_212893		G/T
170070041	212931	SG05S1270	KCP_212931	rs557	A/G
170070593	213483	SG05S904	KCP_213483		A/G
170070700	213590	SG05S1271	KCP_213590	rs12684	C/T
170070735	213625	SG05S905	KCP_213625	rs12685	C/T
170070768	213658	SG05S1272	KCP_213658	rs12686	A/G
170071584	214474	SG05S1273	KCP_214474	rs329471	C/G
170071665	214555	SG05S1274	KCP_214555	rs433936	C/T
170071715	214605	SG05S1275	KCP_214605	rs432615	C/G
170072023	214913	SG05S1276	KCP_214913		A/G
170072363	215253	SG05S906	KCP_215253	rs441562	C/T
170072373	215263	SG05S907	KCP_215263	rs172944	C/T
170072484	215374	SG05S908	KCP_215374		A/G
170072485	215375	SG05S909	KCP_215375		A/G
170072562	215452	SG05S910	KCP_215452	rs191297	A/G
170072712	215602	SG05S1277	KCP_215602	rs186646	A/C
170072813	215703	SG05S174	KCP_215703		A/C
170073179	216069	SG05S1278	KCP_216069		C/T
170073555	216445	SG05S1279	KCP_216445	rs136379	A/G
170073565	216455	SG05S1280	KCP_216455	rs329474	C/G
170074202	217092	SG05S993	KCP_217092	rs984559	A/G
170074303	217193	SG05S994	KCP_217193		C/T
170074359	217249	SG05S995	KCP_217249	rs329475	A/G
170075932	218822	SG05S996	KCP_218822		A/G
170076291	219181	SG05S997	KCP_219181		A/G
170076439	219329	SG05S998	KCP_219329	rs81987	C/G
170077257	220147	SG05S911	KCP_220147		A/T
170078779	221669	SG05S912	KCP_221669		C/G
170078881	221771	SG05S1281	KCP_221771		C/T
170078909	221799	DG00AAJHJ	KCP_221799		A/T
170078966	221856	SG05S913	KCP_221856		C/T
170079102	221992	SG05S1282	KCP_221992		C/T
170079170	222060	SG05S175	KCP_222060		C/T

170079176	222066	SG05S1283	KCP_222066		A/T
170079986	222876	SG05S1284	KCP_222876		A/G
170080026	222916	SG05S914	KCP_222916		C/T
170080378	223268	SG05S915	KCP_223268	rs486817	C/T
170080480	223370	SG05S916	KCP_223370		C/T
170080678	223568	SG05S917	KCP_223568		G/T
170080917	223807	SG05S918	KCP_223807		C/G
170081127	224017	SG05S919	KCP_224017		A/G
170081263	224153	SG05S1285	KCP_224153		G/T
170081464	224354	SG05S920	KCP_224354		C/G
170081779	224669	SG05S231	KCP_224669		A/C
170082330	225220	SG05S177	KCP_225220		A/G
170082361	225251	SG05S1286	KCP_225251		A/T
170082496	225386	SG05S922	KCP_225386		C/T
170083131	226021	SG05S1287	KCP_226021		A/C
170083226	226116	SG05S1288	KCP_226116		C/G
170083558	226448	SG05S924	KCP_226448		A/G
170083941	226831	SG05S925	KCP_226831		A/G
170084576	227466	SG05S926	KCP_227466		C/T
170084823	227713	SG05S927	KCP_227713		A/G
170084981	227871	SG05S178	KCP_227871		C/G
170085097	227987	SG05S483	KCP_227987		C/T
170085116	228006	SG05S187	KCP_228006		C/T
170085151	228041	SG05S928	KCP_228041		A/T
170085191	228081	SG05S929	KCP_228081		C/T
170085217	228107	SG05S179	KCP_228107		A/T
170085834	228724	SG05S1289	KCP_228724		A/G
170086059	228949	SG05S999	KCP_228949		C/T
170086143	229033	SG05S1000	KCP_229033		C/T
170086250	229140	SG05S1001	KCP_229140		C/T
170086709	229599	SG05S930	KCP_229599		A/C
170086826	229716	SG05S931	KCP_229716		C/T
170087721	230611	SG05S932	KCP_230611		C/G
170087734	230624	SG05S933	KCP_230624		A/G
170087780	230670	SG05S934	KCP_230670		G/T
170087950	230840	SG05S1290	KCP_230840		A/G
170088932	231822	SG05S1291	KCP_231822	rs1422978	C/T
170089182	232072	SG05S1292	KCP_232072	rs219416	C/T
170089631	232521	SG05S1293	KCP_232521	rs1592987	A/T

170090569	233459	SG05S935	KCP_233459		A/G
170090765	233655	SG05S989	KCP_233655	rs232863	A/G
170091557	234447	SG05S936	KCP_234447		A/G
170091681	234571	SG05S937	KCP_234571		C/T
170091700	234590	SG05S938	KCP_234590		A/T
170092075	234965	SG05S939	KCP_234965		C/T
170092275	235165	SG05S940	KCP_235165	rs136371	G/T
170092318	235208	SG05S941	KCP_235208	rs1363711	A/G
170092468	235358	SG05S942	KCP_235358		A/G
170093047	235937	SG05S1294	KCP_235937		A/C
170093362	236252	SG05S943	KCP_236252		A/T
170094119	237009	SG05S1295	KCP_237009		A/G
170094581	237471	SG05S944	KCP_237471	rs1422979	A/G
170094615	237505	SG05S188	KCP_237505	rs4867628	C/T
170094780	237670	SG05S1296	KCP_237670		G/T
170095344	238234	SG05S945	KCP_238234		C/T
170095662	238552	SG05S947	KCP_238552		C/T
170095701	238591	SG05S180	KCP_238591		C/T
170096774	239664	SG05S949	KCP_239664		C/G
170097477	240367	SG05S950	KCP_240367		C/G
170098637	241527	SG05S190	KCP_241527	rs1363713	G/T
170098914	241804	SG05S191	KCP_241804		C/T
170099451	242341	SG05S951	KCP_242341	rs1363714	A/G
170099467	242357	SG05S952	KCP_242357		G/T

Table 13. The Build 33 location of SNPs and microsatellites employed for the subsequent association analysis across KChIP1.

Start (B33)	Marker	Public alias	deCODE alias	Variation
169477886	rs1895301	rs1895301	DG00AAGUZ	C/T
169500972	rs1422752	rs1422752	DG00AAESV	C/T
169518355	rs1422754	rs1422754	DG00AAESU	A/G
169653708	DG5S1173			
169661202	DG5S44			
169673518	SG05S872		SG05S872	A/G
169678484	SG05S873		SG05S873	A/G
169693772	DG5S45			
169696877	KCP_rs315773	rs315773	SG05S76, SG05S874	A/G
169702377	DG5S46			
169705505	SG05S876		SG05S876	A/G
169709735	KCP_rs952767	rs952767	SG05S79	G/T
169740666	KNB_24222		DG00AAIGE	A/G
169740703	KNB_24259		DG00AAIGF	A/G
169741172	KNB_24728		DG00AAIGG	G/T
169745438	DG5S1178			
169746339	KNB_29895		DG00AAIGH	C/T
169747941	KNB_31497		DG00AAIGI	A/G
169751683	KNB_35298		DG00AAIGZ	A/T
169751753	KNB_35370		DG00AAIHA	C/G
169751753	KNB_35399		DG00AAIHB	A/G
169753659	KCP_rs314129	rs314129	SG05S83	C/T
169782203	KCP_rs183398	rs183398	SG05S87, SG05S879	C/T
169788696	DG5S47			
169794522	DG5S1592			
169815996	rs1032856	rs1032856	SG05S96	C/G
169833941	rs2055606	rs2055606	DG00AAESP	C/T
169843903	DG5S119			
169859274	KCP_rs888934	rs888934	SG05S93	A/G
169867464	KCP_10355		SG05S229	A/T
169867555	KCP_10446		DG00AAHAR	C/G
169869845	rs933656	rs933656	DG00AAFCS	A/G
169869955	rs2339091	rs2339091	DG00AAFCI	G/T
169890856	rs1862331	rs1862331	DG00AAFCL	C/T

169895698	KCP_38589		SG05S953	A/C
169922308	KCP_65199		SG05S955	A/G
169939577	KCP_82468	rs4242158	SG05S957	A/G
169942902	KCP_85793		SG05S958	C/T
169950654	KCP_93545		SG05S64	G/T
169951970	DG5S955			
169954953	KCP_97844	rs222438	DG00AAJIA	A/T
169959991	KCP_102882		DG00AAJIB	C/T
169961410	DG5S13			
169964489	KCP_107380		DG00AAJIC	A/G
169965813	KCP_108703		SG05S230	G/T
169981986	KCP_124877	rs4146511	SG05S194	C/T
169983195	KCP_126086		SG05S195	A/G
169983317	KCP_126208		DG00AAJHA	T/C
169986202	KCP_129093	rs4867995	SG05S152	C/G
169986236	KCP_129127	rs4867619	SG05S480	A/G
169986799	KCP_129690	rs4867996	SG05S182	G/T
169987418	KCP_130309		DG00AAJHB	A/G
169987666	KCP_130557	rs95822	SG05S196	C/G
169987873	rs905823	rs905823	DG00AAFCN, DG00AAIMM	A/C
169988353	KCP_131244	rs95824	SG05S197	A/G
169988963	KCP_131854		SG05S153	G/T
169989786	KCP_132677		SG05S154	A/G
169991154	KCP_134045		SG05S198	C/T
169992627	KCP_135518	rs48683	SG05S200	G/T
169993145	KCP_136036		SG05S481	A/C
169994769	KCP_137660		SG05S202	A/G
170000721	KCP_143612	rs4867622	SG05S66	A/G
170002069	KCP_144960	rs2279873	SG05S203	C/T
170003855	KCP_146746		SG05S482	C/T
170006325	KCP_149216		SG05S205	A/G
170006644	KCP_149535	rs883849	SG05S206	A/G
170006645	rs883849	rs883849	DG00AAFCK, DG00AAIOG	A/G
170013841	KCP_156732	rs924876	SG05S207	A/T
170015726	KCP_158617	rs236559	SG05S67	C/T
170015858	DG5S123			
170017254	KCP_160145		SG05S208	A/G
170022006	KCP_164897		SG05S209	A/G
170026343	KCP_169234		SG05S156	A/G

170030957	KCP_173848		SG05S210	A/G
170031091	KCP_173982		SG05S157	A/C
170031352	KCP_174243		DG00AAJHF	A/G
170032215	KCP_175106	rs233995	SG05S158	C/G
170032279	KCP_175170		SG05S211	A/G
170032361	KCP_175252		DG00AAJHG	A/G
170033945	KCP_176836		DG00AAJHH	A/G
170037282	KCP_180173	rs213546	SG05S159	C/T
170037283	rs2135046	rs2135046	DG00AAFCJ, DG00AAIOH	C/T
170037346	KCP_180237	rs213547	SG05S212	C/G
170041189	KCP_184080	rs2292147	SG05S160	C/G
170041996	DG5S124			
170042688	KCP_185579		DG00AAJDX	C/A
170043157	KCP_186048		SG05S213	A/G
170043788	KCP_186679		SG05S161	C/G
170044225	KCP_187116		DG00AAJDY	A/G
170044367	KCP_187258		SG05S852	G/T
170044797	KCP_187688		DG00AAJDZ	T/A
170046440	KCP_189331		SG05S214	A/G
170049851	KCP_192742	rs1973529	DG00AAJEB	T/C
170050302	KCP_193193		DG00AAJEC	G/A
170051065	KCP_193956	rs22244	SG05S163	C/T
170051725	KCP_194616	rs23656	DG00AAJEE	T/C
170053657	KCP_196548		DG00AAJEF	A/G
170054787	KCP_197678	rs96284	DG00AAJEG	T/C
170054884	KCP_197775		DG00AAJEH	C/T
170056042	KCP_198933		DG00AAJEJ	G/A
170056474	KCP_199365		DG00AAJEK	A/G
170056955	rs2339139	rs2339139	DG00AAFCR	A/G
170057350	KCP_200241		DG00AAJEL	A/G
170059094	KCP_201985		DG00AAJEM	G/A
170059176	KCP_202067	rs222144	DG00AAJEN	A/G
170059904	KCP_202795	rs875184	DG00AAJEO	C/T
170061292	rs872435	rs872435	DG00AAFCP	G/T
170061351	KCP_204242		SG05S166	C/T
170063376	KCP_206267		SG05S168	A/G
170064770	KCP_207661		SG05S169	C/G
170064881	rs329468	rs329468	DG00AAFCH	A/G
170065074	KCP_207965		SG05S170	C/T

170068634	KCP_211525		SG05S173	A/G
170068959	KCP_211850	rs32947	SG05S185	C/T
170069884	KCP_212775	rs434973	SG05S186	A/G
170070041	rs50057	rs50057	DG00AAFCF, DG00AAIOI	A/G
170073252	rs50364	rs50364	DG00AAFCD	A/G
170078908	KCP_221799		DG00AAJHJ	A/T
170080677	KCP_223568		SG05S917	G/T
170081291	KCP_1152		SG05S176	C/T
170081473	KCP_1333		SG05S921	A/G
170082329	KCP_225220		SG05S177	A/G
170082788	KCP_2649		SG05S923	C/T
170084980	KCP_227871		SG05S178	C/G
170085096	KCP_227987		SG05S483	C/T
170085115	KCP_4976		DG00AAGHK, DG00AAHUT, DG00AAINX	C/T
170085216	KCP_228107		SG05S179	A/T
170085217	KCP_5077		DG00AAINZ	A/T
170089630	KCP_232521	rs1592987	SG05S1293	A/T
170090764	KCP_233655	rs232863	SG05S989	A/G
170094614	KCP_237505	rs4867628	SG05S188	C/T
170095540	KCP_15400		SG05S946	C/T
170095700	KCP_238591		SG05S180	C/T
170096291	KCP_16152	rs486818	SG05S948	A/G
170098208	KCP_241099		SG05S189	C/T
170098209	KCP_18069	rs1363712	SG05S189	C/T
170098636	KCP_241527	rs1363713	SG05S190	G/T
170098913	KCP_241804		SG05S191	C/T
170105556	D5S625			
170167429	DG5S959			
170361737	rs1551583	rs1551583	DG00AADMS	C/G
170389497	rs1457692	rs1457692	DG00AADMR	A/G

The teachings of all publications cited herein are incorporated herein by reference in their entirety. While this invention has been particularly shown and described with references to preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the scope of the invention encompassed by the appended claims.

CLAIMS

What is claimed is:

1. A method of diagnosing a susceptibility to Type II diabetes in an individual, comprising detecting a polymorphism in a KChIP1 nucleic acid, wherein the presence of the polymorphism in the nucleic acid is indicative of a susceptibility to Type II diabetes.

2. A method of diagnosing a susceptibility to Type II diabetes comprising detecting an alteration in the expression or composition of a polypeptide encoded by KChIP1 nucleic acid in a test sample, in comparison with the expression or composition of a polypeptide encoded by a KChIP1 nucleic acid in a control sample, wherein the presence of an alteration in expression or composition of the polypeptide in the test sample is indicative of a susceptibility to Type II diabetes.

3. The method of Claim 1, wherein the polymorphism in the KChIP1nucleic acid is indicated by detecting the presence of a least one of the polymorphisms indicated in Table 13.

4. An isolated nucleic acid molecule comprising a KChIP1 nucleic acid, wherein the KChIP1 nucleic acid has a nucleotide sequence selected from the group of nucleic acid sequences as shown in Table 10, or the complements of the group of nucleic acid sequences as shown in Table 10, wherein the nucleotide sequence contains a polymorphism.

5. An isolated nucleic acid molecule which hybridizes under high stringency conditions to a nucleotide sequence selected from the group of nucleic acid sequences as shown in Table 10, or the complements of the group of nucleic

acid sequences as shown in Table 10, wherein the nucleotide sequence contains a polymorphism.

6. A method for assaying for the presence of a first nucleic acid molecule in a sample, comprising contacting said sample with a second nucleic acid molecule, where the second nucleic acid molecule comprises a nucleotide sequence selected from the group consisting of: nucleic acid sequences as shown in Table 10 and the complement of the nucleic acid sequences as shown in Table 10, wherein the nucleotide sequence contains a polymorphism and hybridizes to the first nucleic acid under high stringency conditions.

7. A vector comprising an isolated nucleic acid molecule selected from the group consisting of:

   a) nucleic acid sequences as shown in Table 10; and
   b) complement of one of the nucleic acid sequences are shown in Table 10; and

   wherein the nucleic acid molecule contains a polymorphism and is operably linked to a regulatory sequence.

8. A recombinant host cell comprising the vector of Claim 7.

9. A method for producing a polypeptide encoded by an isolated nucleic acid molecule having a polymorphism, comprising culturing the recombinant host cell of Claim 10 under conditions suitable for expression of the nucleic acid molecule.

10. A method of assaying for the presence of a polypeptide encoded by an isolated nucleic acid molecule according to Claim 4 in a sample, the method comprising contacting the sample with an antibody which specifically binds to the encoded polypeptide.

11. A method of identifying an agent that alters expression of a KCHIP1nucleic acid, comprising:

a) contacting a solution containing a nucleic acid comprising the promoter region of the KCHIP1nucleic acid operably linked to a reporter gene with an agent to be tested;

b) assessing the level of expression of the reporter gene; and

c) comparing the level of expression with a level of expression of the reporter gene in the absence of the agent; wherein if the level of expression of the reporter gene in the presence of the agent differs, by an amount that is statistically significant, from the level of expression in the absence of the agent, then the agent is an agent that alters expression of the KCHIP1 nucleic acid.

12. An agent that alters expression of the KCHIP1nucleic acid, identifiable according to the method of Claim 11.

13. A method of identifying an agent that alters expression of a KCHIP1 nucleic acid, comprising:

a) contacting a solution containing a nucleic acid of Claim 1 or a derivative or fragment thereof with an agent to be tested;

b) comparing expression with expression of the nucleic acid, derivative or fragment in the absence of the agent;

wherein if expression of the nucleotide, derivative or fragment in the presence of the agent differs, by an amount that is statistically significant, from the expression in the absence of the agent, then the agent is an agent that alters expression of the KCHIP1nucleic acid.

14. The method of Claim 13, wherein the expression of the nucleotide, derivative or fragment in the presence of the agent comprises expression of one or more splicing variant(s) that differ in kind or in quantity from the expression of one or more splicing variant(s) the absence of the agent.

15. An agent that alters expression of a KChIP1nucleic acid, identifiable according to the method of Claim 14.

16. An agent that alters expression of a KChIP1 nucleic acid, selected from the group consisting of: antisense nucleic acid to a KChIP1 nucleic acid; a KChIP1 polypeptide; a KChIP1 nucleic acid receptor; a KChIP1 binding agent; a peptidomimetic; a fusion protein; a prodrug thereof; an antibody; and a ribozyme.

17. A method of altering expression of a KChIP1 nucleic acid, comprising contacting a cell containing a KChIP1 nucleic acid with an agent of Claim 16.

18. A method of identifying a polypeptide which interacts with a KChIP1 polypeptide comprising a polymorphism indicated in Table 13, comprising employing a yeast two-hybrid system using a first vector which comprises a nucleic acid encoding a DNA binding domain and a KChIP1 polypeptide, splicing variant, or a fragment or derivative thereof, and a second vector which comprises a nucleic acid encoding a transcription activation domain and a nucleic acid encoding a test polypeptide, wherein if transcriptional activation occurs in the yeast two-hybrid system, the test polypeptide is a polypeptide which interacts with a KChIP1 polypeptide.

19. A Type II diabetes therapeutic agent selected from the group consisting of: a KChIP1 nucleic acid or fragment or derivative thereof; a polypeptide encoded by a KChIP1 nucleic acid; a KChIP1 receptor; a KChIP1 nucleic acid binding agent; a peptidomimetic; a fusion protein; a prodrug; an antibody; an agent

that alters KChIP1 nucleic acid expression; an agent that alters activity of a polypeptide encoded by a KChIP1 nucleic acid; an agent that alters posttranscriptional processing of a polypeptide encoded by a KChIP1 nucleic acid; an agent that alters interaction of a KChIP1 nucleic acid with a KChIP1 binding agent; an agent that alters transcription of splicing variants encoded by a KChIP1nucleic acid; and a ribozyme.

20. A pharmaceutical composition comprising a Type II diabetes therapeutic agent of Claim 19.

21. The pharmaceutical composition of Claim 20, wherein the Type II diabetes therapeutic agent is an isolated nucleic acid molecule comprising a KChIP1 nucleic acid or fragment or derivative thereof.

22. The pharmaceutical composition of Claim 20, wherein the Type II diabetes therapeutic agent is a polypeptide encoded by the KChIP1 nucleic acid.

23. A method of treating a disease or condition associated with KChIP1in an individual, comprising administering a Type II diabetes therapeutic agent to the individual, in a therapeutically effective amount.

24. The method of Claim 23, wherein the Type II diabetes therapeutic agent is a KChIP1 nucleic acid agonist.

25. The method of Claim 23 wherein the Type II diabetes therapeutic agent is a KChIP1 nucleic acid antagonist.

26. A transgenic animal comprising a nucleic acid selected from the group consisting of: an exogenous KChIP1 nucleic acid and a nucleic acid encoding a KChIP1 polypeptide.

27. A method for assaying a sample for the presence of a KChIP1nucleic acid, comprising:

a) contacting said sample with a nucleic acid comprising a contiguous nucleotide sequence which is at least partially complementary to a part of the sequence of said KChIP1gene under conditions appropriate for hybridization, and
b) assessing whether hybridization has occurred between a KChIP1gene nucleic acid and said nucleic acid comprising a contiguous nucleotide sequence which is at least partially complementary to a part of the sequence of said KChIP1 nucleic acid;

wherein if hybridization has occurred, a KChIP1 nucleic acid is present in the nucleic acid.

28. The method of Claim 27, wherein said nucleic acid comprising a contiguous nucleotide sequence is completely complementary to a part of the sequence of said KChIP1nucleic acid.

29. The method of Claim 27, further comprising amplification of at least part of said KChIP1 nucleic acid.

30. The method of Claim 27, wherein said contiguous nucleotide sequence is 100 or fewer nucleotides in length and is either: a) at least 80% identical to a contiguous sequence of nucleotides in one of the nucleic acid sequences as shown in Table 10; b) at least 80% identical to the complement of a contiguous sequence of nucleotides in one of the nucleic acid sequences as shown in Table 10; or c) capable of selectively hybridizing to said KChIP1 nucleic acid.

31. A reagent for assaying a sample for the presence of a KChIP1 nucleic acid, said reagent comprising a nucleic acid comprising a contiguous nucleotide

sequence which is at least partially complementary to a part of the nucleotide sequence of said KChIP1 nucleic acid.

32. The reagent of Claim 31, wherein the nucleic acid comprises a contiguous nucleotide sequence, which is completely complementary to a part of the nucleotide sequence of said KChIP1 nucleic acid.

33. A reagent kit for assaying a sample for the presence of a KChIP1 nucleic acid, comprising in separate containers:

a) one or more labeled nucleic acids comprising a contiguous nucleotide
sequence which is at least partially complementary to a part of the nucleotide sequence of said KChIP1nucleic acid, and

b) reagents for detection of said label.

34. The reagent kit of Claim 33, wherein the labeled nucleic acid comprises a contiguous nucleotide sequences which is completely complementary to a part of the nucleotide sequence of said KChIP1 nucleic acid.

35. A reagent kit for assaying a sample for the presence of a KChIP1 nucleic acid, comprising one or more nucleic acids comprising a contiguous nucleic acid sequence which is at least partially complementary to a part of the nucleic acid sequence of said KChIP1 nucleic acid, and which is capable of acting as a primer for said KChIP1 nucleic acid when maintained under conditions for primer extension.

36. The use of a nucleic acid which is 100 or fewer nucleotides in length and which is either: a) at least 80% identical to a contiguous sequence of nucleotides in one of the nucleic acid sequences as shown in Table 10; b) at least 80% identical to the complement of a contiguous sequence of nucleotides in one of the nucleic acid sequences as shown in Table 10; or c) capable of

selectively hybridizing to said KChIP1 nucleic acid, for assaying a sample for the presence of a KChIP1 nucleic acid.

37. The use of a first nucleic acid which is 100 or fewer nucleotides in length and which is either:

a) at least 80% identical to a contiguous sequence of nucleotides in one of the nucleic acid sequences as shown in Table 6;
b) at least 80% identical to the complement of a contiguous sequence of nucleotides in one of the nucleic acid sequences as shown in Table 10;
or
c) capable of selectively hybridizing to said KChIP1 nucleic acid;
for assaying a sample for the presence of a KChIP1 nucleic acid that has at least one nucleotide difference from the first nucleic acid.

38. The use of a nucleic acid which is 100 or fewer nucleotides in length and which is either:

a) at least 80% identical to a contiguous sequence of nucleotides in one of the nucleic acid sequences as shown in Table 10;
b) at least 80% identical to the complement of a contiguous sequence of nucleotides in one of the nucleic acid sequences as shown in Table 10;
or
c) capable of selectively hybridizing to said KChIP1 nucleic acid;
for diagnosing a susceptibility to a disease or condition associated with a KChIP1.

39. A method of diagnosing a susceptibility to Type II diabetes in an individual, comprising determining the presence or absence in the individual of a haplotype comprising a halotype shown in Table 2 or Table 5 at the 5q35 loci,

wherein the presence of the haplotype is diagnostic of susceptibility to Type II diabetes.

40. The method of Claim 39, wherein determining the presence or absence of the haplotype comprises enzymatic amplification of nucleic acid from the individual.

41. The method of claim 40, wherein determining the presence or absence of the haplotype further comprises electrophoretic analysis.

42. The method of claim 39, wherein determining the presence or absence of the haplotype further comprises restriction fragment length polymorphism analysis.

43. The method of claim 39, wherein determining the presence or absence of the haplotype further comprises sequence analysis.

44. A method of diagnosing a susceptibility to Type II diabetes in an individual, comprising:

a) obtaining a nucleic acid sample from said individual; and

b) analyzing the nucleic acid sample for the presence or absence of a haplotype, comprising a haplotype shown in Table 2 or Table 5 at the 5q35 loci comprising a KChIP1gene, wherein the presence of the haplotype is diagnostic for a susceptibility to Type II diabetes.

45. A method of diagnosing a susceptibility to Type II diabetes in an individual, comprising determining the presence or absence in the individual of a haplotype comprising one or more markers and/or single nucleotide polymorphisms as shown in Table 13 in the locus on chromosome 5q35, wherein the presence of the haplotype is diagnostic of a susceptibility to Type II diabetes.

46. A method for the diagnosis and identification of a susceptibility to Type II diabetes in an individual, comprising: screening for an at-risk haplotype in the KChIP1nucleic acid that is more frequently present in an individual susceptible to Type II diabetes compared to an individual who is not susceptible to Type II diabetes wherein the at-risk haplotype increases the risk significantly.

47. The method of Claim 46 wherein the significant increase is at least about 20%.

48. The method of Claim 46 wherein the significant increase is identified as an odds ratio of at least about 1.2.

49. Use of a Type II diabetes therapeutic agent for the manufacture of a medicament for the treatment of a disease or condition associated with KChIP1 in an individual.

50. The use of Claim 49, wherein the Type II diabetes therapeutic agent is a KChIP1 nucleic acid agonist.

51. The use of Clim 49, wherein the Tpe II diabetes therapeutic agent is a KChIP1 antagonist.

KchIP1 genomic DNA (Build 33 Chr5: 169716198 – 170098453)

caggagtggg tggagagagg gagggagagt ttgccctgca ggctctctgg 169716247
atgcagaagc cagactcgct gcagaggcag ctgtgctgtt cccggagcct 169716297
GGCTTCAGGG GTGCATCCGT CACTCAGGGT TCATTCACCC AGGCAGGCTC 169716347
CAAGTTCCTG GGGTGCACAA GGTGGGCACT GTCCCTTCTG GGTGCTGACA 169716397
GCAGAGCCTG GCTCCCCTCC GCCACCATGA GCGGCTGCTC CAAAAGATGC 169716447
AAGCTTGGGT TCGTGAAATT TGCCCAGACC ATCTTTAAGC TCATCACTGG 169716497
GACCCTCAGC AAAGgtatgg aaactggcct tgacccttgc tttctgtctt 169716547
gatatggcct ggctggtcgc attgcctcgg tgtggtgagc gtgaccattc 169716597
tggtgcaccc aggtcttgga aaaagctggg gaaattggtg gctgggattc 169716647
gaggttgctg acaacctgcg tcctggcttt gagtaggcgg gcacccagcc 169716697
agggaactca gctggctgta attgcctgga actttggaaa tggagttggt 169716747
ggtgtgtggc tgatacgtta tgggcgggca gagggataga accctttcca 169716797
gagcattgga agtggcttag cgtgactgga gtttcaagaa gttatccatg 169716847
gaaggttgta ttttgttgat aaaagagaga tttgatgcag tgggttgtga 169716897
gtaattctgc agaacagaga cgcttgaggg ggccagtggg aggtggtgat 169716947
gggccggcat ctgctttgcc ctggtggctt cagaaaccgg atcagctctg 169716997
cacctcaagt gccaagagcc tcctctcata gggttccagc gtctcgtgct 169717047
tctggggctt cattcatcgt tctgctttct tggatccctg tccctccaca 169717097
tttcatgcct atgtccatgc ctgtcttttc tgcttctcca ggaactgggg 169717147
tggcaggtgg tttgcaggag taactgtctg ggcagatcag aaagtgtggc 169717197
tatggaccag aattagggct gcagccccag atgggcccac agccgggagg 169717247
cagaaagaag gctaactcct cagggcccag tcctgtgtct taaaccccat 169717297
tttacacttg gcaccaggga aggtgaggcc ctcagagggg tctggccaac 169717347
tttgtggaga tgatgtcaag ggagagcagc agcatgatgt ggttccactg 169717397
gctgaaaaaa cgtctttaaa tattcatgct gtctttcagg aagagtcttt 169717447
gggggctggg gagagaggca ctggaagcag caggcagaat attcagggaa 169717497
ggagcccaca aaactttgat gggattttac aaaatgacaa tgagagcaga 169717547
gaaaggctat atgcagccag atctcatgac atggctcagg tgcccgccac 169717597
ccagcgggtc tggcccagtg tacgttgtgt ggcatgtgtg ggtggtggga 169717647
atgatgggat tctgtttatc tccttccttg ggatgttctg accttcctgt 169717697
tatttcccta ccatccttct gaagtggggc actgctcttc caagataccc 169717747
aggtgggctg agcccccaat gtggagggcc aggctgcctg gcagaattcc 169717797
tggaggccag aagtggggta aacaggaggt taatgggtat agctgtgatt 169717847
gctctcagtg gctttacctc ctggagaagg agaaagcaaa ggggttagga 169717897
aatttcacaa agtctcccca ttcaatcctc agagacagct ggaaggtttt 169717947
ctttcctcat tacagatagc aggacctaag agggtaatgg gtgtggggca 169717997
gcaacccatt gcagcctctc atggagggct tgtccccacc tgcagtctag 169718047
tggcgaccca gaccccacac acagatgctc cctggatgcc acactgagtg 169718097
ctgagatggg ggaatcatgg gggtcaacag gcatagagaa gagatgtctg 169718147
gggcagacta aggagtgcct ccaaacagtg acatctaagc tgagatgagg 169718197
agaggcaggg ctgagaaggt gggaggaagc cgaagctgcc agagggagca 169718247
acatcagagt gttggcctct gcaaggaacc agctggagag tcagaatgcc 169718297
tccctctctc tgctcagaat cccagaaact aagatccatg tgacacagaa 169718347
gggactccgt ggggacctgg ccttcctgtg aactgcttca gtacagcctt 169718397
tcctgtggcc agggctcaga gaggcagccc atggcaggca ccagggcagg 169718447
attgtgtctt aaccgcatct gtcttctttg cttcagctcc gcagagagga 169718497
ccaagtgttt acacagcccc ggctctgcgc caggcacgtg ctaggtgact 169718547
ggtgttctac ccgatccagg tgtttgctaa atatttgtta aatagtgagg 169718597
aacatgggag cagggccagg ctgggagcag ggtagctgag aaaggcctgc 169718647
agagagtcca gaaaacggct ttctaatgtt tacacctccc ctaggtggat 169718697

FIG. 1.1

ttagattcaa ccctacatgg atacattatg attgcttaat gatttctgat 169718747
tttaatttga tttcacttat tcattattca ttgcactgag ttctagattt 169718797
gcagtaatcc aaccctcagg agagggattt ttctttgtcc cttgcagaac 169718847
tgaggaatgt aaagaatgtg ttggaccagg tacctgcttg ttctatggca 169718897
atttactgtt tcttaccagc cttgcaaata cctgggggac aaggagggtc 169718947
caggatcacc ctccctgtcc tgcctgttcc taacccttgg ccacctcctg 169718997
ccatgccaga aatccttctt gccatttgtc taagatgcca gctagcccag 169719047
atttctcatc agcgcttatt gcagagataa actgctcatg tccacctgct 169719097
cacatatctc atcaaccttg aactttcctt cctatccctg atcataattt 169719147
gtggtctgca ttccctttag gaacatgttt gctaaaggct ctcttcccca 169719197
ctagacttca gctccatcat ggcaagacca tgtgcatttt tttgctcacc 169719247
actgtggcca gagctactag catggggccc agaatggagt atgtgtgtta 169719297
ccgtgttaaa cgaatgcaac ggcaccgcac ggcacagaca ccagccgtca 169719347
gcctgagatg accсctggta caggagcttt ctaggaagca ctatgcaaca 169719397
cctgtcccac aggtgctcag caaatgctct ctgaagtctg tttagctgca 169719447
gcaagctgag tctgcagcct ccagcctcca gcctgcgtga gcctccagcc 169719497
acgtaaaaca ttcaggctgg gtctgagctt gcatagtgtc tagggaaggg 169719547
cattaagatt gttcccagaa ggaaaggctg ggtgggcagg cttctggcat 169719597
ccccactccc acccctctgg ctctattttt atttgtttta tttactggat 169719647
ttctcccaca tttaaagaat ctctttggca ttaaaaaaaa aaaaaatttc 169719697
aaaccacgaa tgcagtgagg agcacagttg gtttctagac tgagacatcc 169719747
ccggaccctg cactgtggct cggaagcctc ggactgggtc cctcacctcc 169719797
ctggcattta gtttcctcat ctataaaatg gaattacaat acccttctta 169719847
tggggttgaa tgagattgtg cagataaagc tccctgccta ttaggtgctc 169719897
agtagtgttg atggatatga cttctgttat tagcggatac tctcatggtt 169719947
gagagcccct ccgggctggg actccctctc actcattact tgttttctca 169719997
gcaccaggca cagattctaa gagcaacatc tcatgatcac tttatgaaag 169720047
cctatggcct tgtcagttac tgcatgactt tatttattta tttattttga 169720097
ggcagggtct cattctgttc cccaggctga gtgcagtgat gcaatcacgg 169720147
ctcactgcag cctcgacttt ctgggctcaa gcaatcctcc cacctcagcc 169720197
tcctaaatag ctgagaccac acatgtgcac caccacaacc agctaatttt 169720247
gactgtttat agagacaggg tctcactatg ttgcccaggt tgatgtcaaa 169720297
ctcctggctc aagagaccct cctgccttgg gctcccaaag tgctgggatt 169720347
acaggcatga gccaccacgt ccagccactg gatgacttta gaccactgct 169720397
tcccctctgc tcaacttgtt ttcttaaggg cctacccaga gccatctccc 169720447
tcacctgatt ccttattagg agttaaaagc ctgactccca gagccaggtc 169720497
ctcgcctgct gtttaaccta ggagaagccc agctcctggc tcggatgctt 169720547
ggtgaaatca ggggtctggg gaacctgcgt cttcctcttt ctgcacagtc 169720597
agctcccctc cacccgcctc acagacttcc tgggggccgc tggcaggaac 169720647
cagaagttgt gcaggctcca ttctggctgg ggaggtttaa actcatctcc 169720697
ttctgcactg ggaacaaatg ttaccccagg cacagatgac agagccaaag 169720747
tgagcagaag ggaggaatcc aatccaggag agcttctagt gtcctccagg 169720797
ccacccatga ggctgcgggg gtggggaaaa ggggtgtggg aagatgagat 169720847
ctatctcaag gacaaggccc tggagccgta actctcccct cccgcccagg 169720897
cccaggctgt tcctcttttt tcgaggcaaa acctcagctg ccccatcagt 169720947
gacacactgt tcctcttgcc tcctcccact gctgttcaag atcctcaaga 169720997
gactgacctt ggacccgggc atggactctg ccttcaagca ggccaggctg 169721047
gagtaccaac tctgcctctt accagctgtg tgaagttgtg tcatttgaac 169721097
accaccccaa gccaaggctc cccactttta attggagata ataataatat 169721147
caatggcaca aggctgtttt ttaatgtaat gatgatatga gtaagagata 169721197
tcagctcaca ggcaaatccc aactctgctc ttgcagggca cccgcccccg 169721247
cttacatttt gtgccctagg caccttcctt gcctctttct agtcttgatc 169721297

FIG. 1.2

ctggaggtag	ggattgcaat	caccatttca	gcaggtaagg	aaactggggt	169721347
ttagctaagt	gtcgtggctc	ccctggtgag	tggcagagct	gggattagaa	169721397
cccaggtctt	gctgcagcca	agacaaggta	cattcctctg	cactcctagg	169721447
gctggagaag	tcacgcctgc	ctgcactact	ccccaccttg	ccaccagcag	169721497
agagtccccc	agcgtcccac	taattctgtt	ggtgggtttt	tccctgctgg	169721547
gtctgatcag	agcagccacc	tgtcatgcaa	agggttgtga	caaattccat	169721597
aaagtgtcat	cacctgggtt	atggggaaag	ggaacactcc	agaggccaag	169721647
atcagcagga	cagccatacc	catgctctct	cagtatccct	atcacctctc	169721697
aggcaggtgt	gcaggcccaa	agcacctgcc	agacactgag	taggctctgt	169721747
cccatgaggg	ccactccccc	atggctctcc	cttcttacag	gccaagtgtg	169721797
agaagtgttc	ttgggtgtgg	gaaaatacac	acaaagtttt	ggacactagg	169721847
caggctggaa	ttgaggtgtt	gcagctgttt	actggaattg	tctgggaaag	169721897
cagaagcctt	cacactgggg	actttgagac	ctgtgagata	tcatcatccc	169721947
tctaccaaga	ggagaatgcc	acctgtccca	tgaaaagcta	agcttcaatg	169721997
ctgccccttg	ctggggaaag	agagtcccca	ccatccgagt	cctggctcgc	169722047
tcactgtcct	ggcagtgagg	ggctgagcaa	gcactctggt	catgttacaa	169722097
cagccccact	cactctctgc	aaccctggaa	cctctgagtg	ccagtgcttt	169722147
gtcacaggaa	gaaagtttga	ttatccaggg	cttctgggtc	cctgcctacc	169722197
tctccagccc	caagctagag	cctgccagga	ggggcatgtg	ttcaccttgg	169722247
ccctcctgat	gtccagtagc	cttcatccca	gcctactggc	ctcaccaccc	169722297
ttgcccctct	gcagcaggcc	cagcattccc	tgacccattt	gggttgttca	169722347
ggtgctcagc	tcactagggt	ctccatagtc	ccacagtaga	aggcagagaa	169722397
gaaggaggga	tcacctgccc	ctctggagcc	tccgggtctt	tctcctagat	169722447
aaccctgtta	ccatgcagga	gtaatttgtt	cagggccatt	tatcctggca	169722497
ctgctgcaca	gacatcctat	taacttcagg	accacagggg	agcggctagt	169722547
ttgctccaaa	ttaaaagtag	ctggaaacgg	ggccctctgg	caggcaggag	169722597
agttcaggct	gccacaccac	agccctggga	gaagtggatc	tagtcaggtc	169722647
ttcatcagcc	ttctaagtcc	agggcctcct	ttgccatgcc	acaggaccc	169722697
tcatcttccc	cagtcttctt	agggttacag	aatctcccct	gggccatctc	169722747
tctcagcaga	cccaggtccc	aaatccctga	aagcctttgc	ttcccaaggg	169722797
tggaagtggc	gatgtgaagt	cactgtggaa	ggaagcagga	tgcagggcgg	169722847
gaaaactctg	gacccagagg	gacctgggct	ccaaccctgc	catgcaccaa	169722897
caggacagcc	ttgggcaagc	cattccccat	cttgagtctg	tgtccttccg	169722947
taaatgggcc	agtaatttcc	atctcatgtg	gctactggag	atggaatgag	169722997
atgggacatg	tgacaggcac	aggacctggc	tcatacaagc	tgctcagtaa	169723047
aagtcaagtt	ccccacccctt	cttttctatg	atacgacctt	ggatttgtag	169723097
ccaagagaaa	caaggctgag	cctctgtggg	tcaagtcctc	ttcccagctc	169723147
ctatccagat	gtgctgctat	ttcaaaatta	tccccccctgc	ccccagtcac	169723197
tcttgatgac	aagttctata	attaaaaatg	tgccaacaat	ggaaatgatc	169723247
ctttttattt	agttgttcat	gggagaattg	gtcatccatt	ctcatgagaa	169723297
tgggagccct	gtgaaagcgt	tcaccacgtt	caccacgtgg	gaatcaccta	169723347
gagtgagtgc	ctcaagcacc	tgcagccgag	gaaggaaggt	tgaataaata	169723397
acgactaaat	gctttccctg	ccgagcaaca	tcaggccatg	tggctggagt	169723447
tcccttttg	aggtctggtc	ttagtcaggc	ttgctctgga	gcctaccact	169723497
ccctatctcc	cttgtctgaa	ttcctgtgct	ggagtttgac	agcagtgacc	169723547
agccagaacg	acctggatga	gacaagggtc	agtgcaaaca	agaccaaagg	169723597
cctgttcctg	cccccattcc	gctctcatgc	tctgctgggg	gactgcccct	169723647
gggtgcaggc	ccacactgcc	tatgcatcac	agctggccag	gtgctcaggt	169723697
gaggcggcgg	ttcttccccg	ttgtccacct	gcaccccacc	cagaagtgca	169723747
ggaggaggga	ccccactgaa	aggcaggcag	caggggagag	gagctttggg	169723797
ggagaggatg	tggaaatgag	gaaattgcat	aggcctcccg	ggccagctgg	169723847
aggaaagaaa	ggccaggact	cctgaaaaag	actcatggga	agtcatttac	169723897

FIG. 1.3

tatcaccact	gaccacgctc	tctgtcacag	gtcttcagtc	taggggcaga	169723947
agaaagcctt	ccttctctgt	taggatgagg	ggaggaggac	catgaacaca	169723997
aagctaacct	tggtcccctc	tggctgaagc	cactgagatt	ccatttgtg	169724047
ttcttagaag	aacacccgct	ttggagccag	acctgggttt	gagtccaaat	169724097
cctcacaact	gcttgctgtc	ttaggccatc	aggctgctta	tcaacctgat	169724147
ggcctaagct	accatacaaa	gacacggtgg	cttatcaaca	acagaaatgt	169724197
atttctcaca	gttctggaag	ctggaagtct	gagatcagga	tgctagcact	169724247
gtggacttct	cgtggggact	cttcctggct	tacagacagc	atctcctgct	169724297
gtattctgac	gtggaggaaa	gagagtaagc	tagctctctg	gcctcttctt	169724347
atagacacac	cccattcaag	aggctccgcc	ttcatgacct	catcacctcc	169724397
caaaggcccc	accttcaaat	accatcacct	caggagtggg	atttcaacat	169724447
gtgaatttgg	gggacgggag	gcacaaatat	tcagcccatt	gcactaagta	169724497
aatggctttt	ttttctgggc	ttcagtctct	tcatctctaa	aatgaaggag	169724547
ctgctgattt	caaaggcctc	tttcagcttt	ggaatttaaa	gattaaacaa	169724597
aattgcagca	ctgctggtgg	cacctgccat	gtgcccagca	ttgcctgagc	169724647
actccatgcc	caatatttta	tttagtgcac	atgagaaacc	taggaggtgg	169724697
agtgctctaa	ttaaccccac	ttacagatat	aaagagcgag	cttcagacgg	169724747
gggaccggcc	tgcttggagt	cacacagcca	gcatgaagca	tagccacaac	169724797
tggaagccta	ggcggtctgg	ccccaagccc	tgggttttac	ttccctcccc	169724847
agcccatccc	cagtacactc	tttccatttc	tgaaaatcag	atccagggta	169724897
agaagcaacg	aagacaaaac	agattccttc	ccagtttggc	caagaggcaa	169724947
cacacactct	tgttttcgaa	atcaagactt	caggacctcc	attctgactg	169724997
aggaagtgca	attgaggaga	atgccctctg	agactcaagc	tccccgatcc	169725047
atcccctaaa	ccgttaccca	taggtcacct	ttcacagtca	aacaacaaaa	169725097
catatgggga	gcaggcccga	cagccaagac	tacagggagg	ggagaaaaaa	169725147
ggaaacacca	cccagcaaga	tttcctgttg	tatttctagt	ctggccaatt	169725197
ttcatttatt	gctggaatga	ggtcagttgg	aagctgaggc	agagaattgg	169725247
gcaggaatca	ggtagggagg	tgtgattctg	gggcttgtat	ctgagaagct	169725297
ggggttagcc	taattttctt	tctgtaatct	tttgattaac	tgtgggccag	169725347
tttggatgac	atttttcaaa	ccatctgtgc	ttggcaggct	gggccgagcc	169725397
caggcttact	gctcggtgtc	tgcaaaactc	agcttggagc	cggctatcac	169725447
ccggagcctg	ggatgtctct	aagccatgaa	gcatattgga	ttgcagaatg	169725497
atccacaaca	tccctgtgct	gattaactct	gcccaggcct	cacaagttca	169725547
gaaacagtgg	ctgtcatttc	aaacgcaaca	ggaaacatga	ggggaagggc	169725597
catcgccatc	ctctgttgag	tgctacctat	tttctggggg	ctttacaagg	169725647
attcctatat	tcagtccagc	cctgtctctg	tgagttgttt	ttattccaaa	169725697
ccaggggctt	tgagaggctg	aataacttgc	caacatcaca	gatacagcac	169725747
tgtggttgaa	aaggtcatgt	gcaaacacta	atgttccttt	gaacacgcct	169725797
ggtcaaacct	gtcagcaccg	tcacttctgt	cacagactga	attgtgtccc	169725847
cttaaatgtg	tatgtcaaag	ccctaacccc	caaggtggct	gtatttgatg	169725897
atagggcctt	gatgcaggag	attaaggtta	aatgaggtca	taaggttggg	169725947
atcctaatcc	aacatgactg	gtgtccttgt	aagaagggga	agagaccagg	169725997
agtacacaca	cacagaggaa	aagccatgtg	agggcaagat	ggccaactac	169726047
aagccaggaa	aagaaacttc	atcagacacc	aaccctgccc	gaaccttaat	169726097
cttggacttt	cagtgtccag	aactgtggga	caatagattt	tcgttattta	169726147
actacccagt	ctgcgacatt	cgattatggc	agcccaagca	gactaataca	169726197
gccccataga	ccattctttg	catagcatcc	tttcctatat	ttttaactgt	169726247
gacaaacata	tataacatta	aatttactat	tttaaccatt	tttaagtgca	169726297
cagttgtggc	tttaagtaca	ttcacatgtt	gtgcaaccat	caccaccaac	169726347
catctccaga	acatttttct	tctcgcaaaa	ctgaaactct	gcactgcacc	169726397
cactaaaccc	ttccccattt	ctgtctaccc	tcaggctctg	gcagccacca	169726447
ctgtactttc	tgtctctatt	aacttgactg	ttctaggttc	ctcatataag	169726497

FIG. 1.4

```
tgagtcatga acagtatttg tgtctggctt atttcactta gtgtaatatc  169726547
tttttttttt tttttttga gatagggtct cactctgtca tccaagctgg  169726597
agtgcagtgc tgtcatcaca gcgcactgca gcttctacct cctgggctca  169726647
agcaatcctc ccacctcagc ctccagagta gctgagacta caggcgtgcg  169726697
ccaccaccac acccaactaa tttttaaaa ttttttatag agatgaggtt  169726747
tctccatgtt gcccaacctg gtctcaaact cctaggctca agtgattggc  169726797
ccaccttggc ctcccaaagt gctgggattc caggctgcca tacctggccc  169726847
tcacttagtg ttatgtcttt aaggttcatt cctgtaacag cctgtgtcag  169726897
aattcccttc ctttttaagt ttgaacaata ttccattgtc tggatactac  169726947
attttgcttt ttatccattg atggaccatt cccatatttt taaaataaaa  169726997
aatgaatcat atacgattat aatcccctta ctggaaactg tctccagtgg  169727047
tttcttgaca catttagaat taaatgcaga ctcctctcag tggcctgtga  169727097
ctttgcatga tccgtcctct gcatttctgt ccttctcctt ggactctttc  169727147
caccaaatac ccccaggctc tctccctcaa ttcattcaaa tcccctcctg  169727197
cggttgccgt ccctcctcat ctcccccaac acattgccta atgctgcctt  169727247
gcttttctgc acagccctta ctgctcctgc aataatatta cacatgtgtt  169727297
tgcttggtga ttttaaatgt tttaatggaa aatgtctatg tttaaggtat  169727347
acagtgtgat gtcttgatac acacatagat aatggcctga ttatcacagt  169727397
caagctaatg aacatatccg tctcttttca tagttacctt tctgtgtatg  169727447
gtgagaacta ctctcttagc aaatttcaag tatacagtgc agtcttatga  169727497
actacagtct ccttgctgtg cattactcta gagcttgttc attctccata  169727547
gctgaaactc tatacgcttt ggccaacatc tccgttattc atttgtttat  169727597
gatccagctc atccactaag agtcgagctc tgtgagggca gggaattttg  169727647
cctggccttg actacttccc cagcacctgg tgcagggcct accacatggt  169727697
aggccctcat tgggagttga gaggttgagc tggcagatga ggaacctgag  169727747
gcctggggaa ggccacccag caagccagac gcagagctgg ccttgaatct  169727797
gggcttcctc ctctttccat tccctacagg ctcggcactg catgcccttt  169727847
aaaggttcca gttctgtatc caccatttcc acgtccgtct gtccatccac  169727897
acttcctcct tagcaaggcc gcccatgttc ctgcatccag gacatgaggg  169727947
gttaattaag atagtcatct ggcttctcag gctaccatcc taagaacagc  169727997
cctcctcagt tctggagctg gcgggccatt tggttcatct ttgatttgtt  169728047
cttgccatgg agagagggga acctgccgct gggaaaggat ggcgatggtt  169728097
tccagtgtgc tctgctccat tcagccaagg ggctcctctg ggagggcatg  169728147
aagtgagcag tcaccagcga aggcatctgg gggctgcaga cgcagctggc  169728197
ttccatggct gtgttcccct ccagcccttg aggatccagg actttctgga  169728247
aacatgattt tggagttcac tggatgctga atccattacc accaaattgt  169728297
gtgaccttgg gaagtccaag ggagtcactc cttcgagcct agcctccttt  169728347
tctgtaaaat gtgtgcaata atgccaatac cacaggttta ttaaagtaac  169728397
gcacttaaaa gtgtttagtg tagggcttgt gtcaaattaa ggattcaaca  169728447
aatgatgggt ggttttgctt ttatttggct ttgctgttta tcagggctga  169728497
gcttaaatct ccctcattgc atcctaggca aaccagggac ctcccatgtc  169728547
ttgggaaacg gctgagtgac tgaaatcacc cacgtgggcc agaaaagagt  169728597
gagagatgtt ttcaacatac tctttgcctt tcctttccct acccgggatg  169728647
cgagtatcag tgacaaagag ttttattcta gggagatgag acaggagagc  169728697
tcacactgta ttcattgagc aagctcttca tgtccagaac ctttaaaatc  169728747
tcctgtacac tcctgcccca ctcccagccc acactctcct acggatgaaa  169728797
aaataagaag gggcagtaaa accttgtctt tgtatagagt ccaccggggg  169728847
ctcaacagag gaggtggagg aggcctcaga cctggatgtc gtggcagtca  169728897
ctgcaccctg ggtcagagcc ccctgaggac accaccctgg aagggagaag  169728947
ctggctggaa ccacaaagcc ccatggacaa gcaagctctg gcactacctt  169728997
tgagcatctg ctgtgcctgc tggcctgtct cacagggcac atgaggtaaa  169729047
aagacatcag gcacaggctc ccccatgttc attatatctg gaaatttcag  169729097
```

FIG. 1.5

tctggccaag ggagcttctg agagcctgaa ggtggccagt atgtgactgg 169729147
aagtcaaggc cacatggcac agtgaccagc gtgagactcc tccaaatgtc 169729197
ctcagtgtaa gggtggggaa actgaggcca gagcaaggaa caccccttgag 169729247
taagctaccc tcaaaacgga gcctcctctg gctggtagct gggggcacag 169729297
ggatggaggg tagcctggcc cctcctggaa gtggtggcca cccagcagat 169729347
ggctcttcat tgccacacag ccgatgactc atagactaag cccaagcaag 169729397
acccctcgcc tcctcccttc atctctgcac tctccccttc atggcctcac 169729447
ctctggggga gactcccaag tctctctctc ttgccttggc tcttttctta 169729497
agctccaggc ctgcaggtga ctccttggct ggactgtgaa cttgttggaa 169729547
gggcaggggc tacattttag ttatttaaga acgtgcagtc tggcacggtg 169729597
gctcacgcct gtaatcccaa cactttggga ggctgaggca ggtggatccc 169729647
ttgaggtcag gagctcgaga ccattctgac cacagcgaaa ccctgtctct 169729697
actaaaaata caaaattagc tgggcatggt ggcacatgcc tgtaatccca 169729747
gctacttggg aggctgaggc aggagaatcg cttgaaccag aatgtggagg 169729797
ttgcagtgag ccacaatcac accactgcac tccggcctgg gcaacaagag 169729847
caaaactccg tctcaaaaaa aaagaagaaa gaaggaaaga aggaaagaaa 169729897
aagaaagaaa gaaagaaaga aagaaagaaa gaaagaaaga aagaaagaaa 169729947
gaaagaaaga aagaaagaaa ggaaagaaag aaagaaagga aagaaaggaa 169729997
agaaagaaag aaagaaagaa tgtgcagcac ccagcacaag acctggcata 169730047
gagtaggggc ctaacaaatg gatggattga tggaggatgg gaggaaggac 169730097
cactagaccc ttccagttga atgtctttct atagccccta ctcaatcctt 169730147
gtaaaaccaa aggagacctc tctctcctga ttttactctt tctctttaca 169730197
tgtcccagtc tcgagccttg ttctttccat ctgtcactcc ctttccactc 169730247
tcagaaccgt tcctgaaatc tgaacctttc taacctctca cccgctttgc 169730297
tgcagcagcc tgcagactgc gtttcttccc atttcttccc tttctgactc 169730347
ctccacacca ttccaaagag atggcccatc taacccattg acccagaagc 169730397
cctacttcta gaaatctatt ctaagcaaat catcacagct gtgcatacgg 169730447
acttttattt agaggtattc attatggtat tattgcatta tttataacag 169730497
tgaaaaactg gaggcaatct aagtgtcaat ggaaaaaatt gtgtattaaa 169730547
taaattttgg ttcatctgtc tgatggaaca atattaaact gttgaaaaat 169730597
tattttagga actaattaat aacctagaga aatgctattg atatcgtatc 169730647
aagtaggaag ccaggagaaa aaaaactgta tgatgaatgc agttccagtc 169730697
tgtgggaata gatgtgtatg gaaaagtaaa atagagaaga aatacactga 169730747
aacattagtt taggttttag cttggattaa aggtgagttt ttaaagtttt 169730797
tgtttgtttg tttgtttgtt tgtttgtttt attgagacag agtctcactc 169730847
tgtcaccagg ctggagtgca gtggcgcaat ctcagctcac tgcaacctct 169730897
gcttcctggg ttcaagtgat tcttgtgcct cagcctccca agaagctggg 169730947
actacaggtg ccggccacca cagccagcta atttttgtat ttttagtaga 169730997
gacagggttt cacaatgttt tccaggatgg tctccatctc ctgaccttgt 169731047
gatccgcccg cctcagcctc ccaaagtgct ggcattactg ttgtgagcca 169731097
ccgtgcccgg cctaaagttc ttcttgatgc ttctctgcat tttctgaatt 169731147
gtcttcaata agcatccata tttaatcaga aaccacaaac atatcattca 169731197
ctaaatacac atcttcaatc atacagttct cagtatggga acgcatgaaa 169731247
gttctgcttt cactggcata tcactggctg ttcatgccat gtggcaatac 169731297
accccgaact accagatttg gcactcccag ccctaacccc acagtctcag 169731347
acctcagccc actccctagt cctgtgtccc cgtgaccaaa cccacacacg 169731397
cattctcctc cagccaaact ggtccccaca tgtttccaaa ccagccttct 169731447
gttctgtgct cctcagccta actctcaaat ggttcagaaa cacaaattcg 169731497
catgtgcaca gagagagaca gagacagaga gaaaatccaa atatgataaa 169731547
atactgatca tcattggtga acctagatga aggggaggca tgcttacaat 169731597
ttgcattgta gttggatatt ttcaaaataa aaagctgggg aaataaagga 169731647
gcagtgtagt atagtattta agggcataaa ttctgcatga aattacctta 169731697

FIG. 1.6

tttcaagttc cagtcccact gcctattagt tgggaagtag taacattagg 169731747
caaggtactt actttctaag actcagattc ttcatcagta aaatggggat 169731797
aatgaaaatc ctggtgtatt tgtttcctac agttgcccag agaatggaat 169731847
gtatgtgtgt aaagggcttg gcgaagagtg ccacacaccc ttgatcatga 169731897
actgttagta tcagtgctaa atatagaaat caatttatta accgtgactc 169731947
tattcatgat attctctacc tccataagct gctcatccct ggacaactaa 169731997
gtaaagtgct acagctttgg aaacttttct tgcacggttc tttttctgcc 169732047
actagccctg gaagctgctc caatgcggtg cctgccccgc tggtatccat 169732097
acctccaggc cctggcacag agcctggcaa gggggaagaa gccattaaat 169732147
gcactgaacc ccaaatgaga atctcaaagg gttcaagctg tactttaaag 169732197
aaaactcttc tcatcaggac caagtttgca cttttgctga tgcagccact 169732247
ctattcccat gggcttcctt gagataaggc atcaccttga taaattagct 169732297
gtagatatag gcgtcttgca gttggcatgg gaaagcaatt taatttccaa 169732347
ttaagcctga tttctgggcc aggaggttgg cctacctcgc actggaagga 169732397
ttattctggc caggcctatt attatcacgg gtcatgattc tcccatgaag 169732447
tggactctca aggaagctgg tccttcaacc attggaatgg ttcagtgagg 169732497
cagaaatacg gcctctgtgg gtaggaccct ttttccccag gaattaagtt 169732547
tatacaagta gagtcaggga agttcaaagc aaagataggc agtctgtttg 169732597
tggccaaaat tgttaagtca gggtacccct agaaatgaag caagagggga 169732647
gagagagagg gaggtgaggc agtcatcaat caggcccaca agcaagagag 169732697
gcgggaagtt gctagtaaga aaaagacggc aggaggtagt tctctgagcc 169732747
caaatcgaaa agaatctgaa ttatcggttg aaggagacac acttacttga 169732797
agagagaaca gacatttgtg aagcatcttt tatgcaccgt gctgagtact 169732847
tcacattcat gattgatgat acaatgcacc ctgtaaaaca aacactgtga 169732897
ggctcacttt ccaattgagg aaactgagat tcaggaagat taaataaact 169732947
gcccaaagtc atgaacaagg cagattcaaa ctcttgtttt cctgagcttt 169732997
tctccctgca ggctccctct caaagacaaa tacaaaaaca tcatttaggg 169733047
ccataaggat aatgccatac tcagctgtat cttacccacc aaaattgtaa 169733097
gcatgagaaa aaggcctttc aaacaagtcc tgagagagtg aaaataaatg 169733147
gtggctgagg ctgcttgggg cgaatgatct gatggaagag ctaacaatat 169733197
ctacttctct tttgggtgtt gtttttgctc ccatctgtcc ctcaaggagg 169733247
gagacctgag acctgggcgc aatggcccag catggctgag aggctcctgt 169733297
gaggtcagga tctcctccca cagctcagac tgcttcaaac cagcggggtt 169733347
ctggcttgtg gctgagggga tttcaattca gaagggttgg aaagaaacaa 169733397
cagaggggaa tgagggatca tgaccagtgg agccacagaa aatttagtta 169733447
ggtgccaaga aggtatgaca tggcctaagt ttagttaacg atagtaaaag 169733497
aggactctga ggcaatatgt aagcaagcat gctgtcaact cctggacaaa 169733547
ttctagagcg catgattaaa cccatggttt gggaacactt gtgaaagaaa 169733597
gtagagatga atgagaggcg ggtgcatttg ctgagaagga gctgtgccgg 169733647
tgtaccagtc tcccttctgt tctgcttttg catagtgacc agttcaagga 169733697
tcgctgcaac catggtgtgc ctgggttcca gttgggcgtg tgatgagcta 169733747
tgggctggaa agcatagatt taggcaggtg ccagctggcc tcgtggtcct 169733797
gtctgtcttg gcagtgccca cagcagaacc tttgtgggac attttcagat 169733847
ccttctgctt ggccatcacc cccacatcta ttgagacttc agaggtgtgg 169733897
ccccagggag tcaattgaga gcctgggctc tgtgatggaa aggtatctgg 169733947
aagcatctaa caagctctca atagttgacc ttgacctgct tggcattttc 169733997
cacttttgat atggggtaaa gacaagaaca ggattcccag tggttagagt 169734047
gttttctgga gcaataccac ctagatttga attccagctc tgctatttgc 169734097
taacttctgc cttggggcaa gttaaatctt ttccttgtgc ctccattggc 169734147
tcattggtga aatggagata ctaataataa cctcaaagga tgttgttact 169734197
gttcaatgag ctgtgcctgg aaagatcctg gcattcaggt aggtgttcaa 169734247
caaatgctag ccccttattac cgttaggaat gatagattct tgcacagcaa 169734297

FIG. 1.7

gtgatcagct aaatatatgc ccaaatgaaa gtggctccat cttgctatag 169734347
tgagttattc atccaaagag gtgttgctgc aggttgtcat tgaagagaac 169734397
tattgtagaa agagtgtgac tgtgttctcc ccgacaatac ttctgacacc 169734447
acgtaagagg gttttcttcc cccctactga taccaactag tttggacacc 169734497
aactgggtgt cctacaattt aattcaattc tgacactaac tacccagagt 169734547
tagctcagac cccacaggtt aagaactcag tcccacaaga ctgcccccat 169734597
tcaaatgcca gccaccaata gggtgtcctg actatccaca cttccacctg 169734647
actgacagaa cattcctaca acctccccta cacctccaga taggatataa 169734697
taatttacta gagtgatcca cagaactcaa aagaacattt tacttactat 169734747
tgacacttac tattacatgt tgattacaga ggatataact cagaaacagg 169734797
cagacggaag agacacacag ggcaaggtat gagggatgca gggtggaggt 169734847
gcagagtttc cgggccctct cccagcacct tgacgtgttc accaacccag 169734897
aagcccccca aaccctatta tttaggggt tttatgaaga tttcactaca 169734947
taggcatgat tgttaaacca ctggccattg gtgattaaac tcaacctcca 169734997
gcccctcttc cctctgcaga ggttgccggg tagagctgaa ggttctaact 169735047
ctctaatcat ggcttggtcc ttctggcaag cagctcccat gccgaagcta 169735097
tttacaggcc caccaagagt tatctcactg gaaaaaagac actcctatcg 169735147
cccctaaagg acctctgtac caaagaccaa atatctttct gtgagacaac 169735197
agagagttca agcaccaaat ataaagtgga gaagcactag atgatctcta 169735247
aagtcttact ggcacttgga gaacaagtgt ttgtatttga acatgcggaa 169735297
tcaaagggga gttgagtaaa aggggctcca gaattgacac aggaggagga 169735347
ctcagtgcag caatctcatg gggcgtgggg acagaagaca catcccaaag 169735397
cttcatgtgc ctctcaagcc cctgcttttg ttttatgtgt actggggata 169735447
ggggaggttg gtatggaatg atggagatta tgggagaaca gagtccatct 169735497
aagccacttt tgactctgca actgggggag atgcagctgg cctgggaagg 169735547
aatcacaaac gtggtccagt actcagttta gagttgttgg ctttgcttcc 169735597
atatacctcc ctttctcatc tcccaaatcc tttgaggaag ttggctggtg 169735647
aaaatgtact tatgtaagtg gggagggaga gttgtgcaaa gctaggaaga 169735697
agctgagttc tgcatcagag gtgacatgag aaagaaccag gaaagcactg 169735747
tggagaggag gatgacccat caactgactc atctgggga caggatctgg 169735797
gagccagagg tgatggagaa aactaaagcc ctcctcctgg cccccagtgg 169735847
gaatctgatg gagcctggtg gagagcctca catttctaca gggcacggtg 169735897
tgggaggggc ctggaggcct tgtctctgga tgcactaggc tggcagttct 169735947
gaagcttttc atcatcagga ccctttaca tgcttaaaaa atattaagga 169735997
tcctaagagc tttggtgtat atgggttata tctattaaca gttaccattt 169736047
tagagattag aactaagaat ggtaaaaata tttaatttga atttacttat 169736097
tttaaaataa taatacatcc attagttgct aacaaaaata acatattttt 169736147
ttgaaaaaca attatgcgtg gcaaaaagta tattgggaga agtggtattg 169736197
ttttacattt ttcacaaatc tctaatgtcc agctttagaa aggcacctag 169736247
aatctcattg ctacctcggc attcagactg ttttaacaat gcatgttaca 169736297
tgacctctgg aacattccat tgcactctca taagagaatg aaaatgaaaa 169736347
aggcaaataa tgtcttagta ttattatgaa cagagttttg actttgcaag 169736397
cctccacttt gagaactgct acactggact gtagtgaatt tctccatgtc 169736447
tctctgatct ttctttggtc attttctttc ccttccatgt gacagggcaa 169736497
tggctggtga ggtacaggaa ggtggcactt tgctcaaaca gtgtcttctt 169736547
aaatatttca tagaattcaa actcccccaa acacaagacc aattcaaaga 169736597
atactggata ttctcacata acagcctgtg ctgccaatga acaataaaat 169736647
aaatgcagtt tgcaatgccc tgacccaagg agtttaagat aaattttgga 169736697
tgagttgttg atttagagga ggagctggta tcacttcagt aagtcacaga 169736747
aaataagatt atattaatat ttatattgca ttattttaaa tctgcataat 169736797
gctgagtctt cactgtgaag aaggaagccc ctcacaatga ttagtgaggg 169736847
gtagggaggg agaatggcaa gaagacacca agttccttgc aggcaagcaa 169736897

FIG. 1.8

```
atagatacat cataaaagtg aagtgaaatt ccagtcctct gagatcttca  169736947
taaatagaag aaaccctcat ttctttcctc ctctggttgc agcttggact  169736997
gatgagctga agctctgtct gagacctggc actgttagga tgtcccccag  169737047
ggttctttcc accccagttc tggagctcag gtggcccctt gcctctgaat  169737097
tccaccgctt tgtctgagtt ctggaggacg gcacatggga gaaccatcca  169737147
ggtgcacctc tccaggtatg agtcactagt ccatgagagg acaataataa  169737197
atgatggaag cactagacac tcattagcag agtggtttat taagaactga  169737247
tgaaggttct ctgctcccag gcagatatta ttgcaaaaaa acacgtaggc  169737297
acagggtcta actccatcat gcctaaattc ccattatttc atgcttatcc  169737347
cgtgcataaa gttctgtgag cagcagacag ttgtggcatt tgctagaagg  169737397
ccagtcttta ttgacaggag gagaacatct atctcaagca aatgaaggtc  169737447
atcattaata atttatggga cagtgggggt taggcatcct cacatactaa  169737497
tttttctaga ggaacatggc cttttcccct gcagggattg tttgggtatt  169737547
ctgagtttct gtgtatttta gtcccaaatt caggtgcatg gaaaccattg  169737597
acaaaataga ccctttaaat cagactccaa gttgggactt cctttcttat  169737647
ttttcttcct tttttaactt aaatttttga gataattgta gattcacatg  169737697
aagctttacg aaataataca gagacattcc gtgccccctc tacctaatgt  169737747
ccccaatggt aatatttaat attttgcaaa actatagtac aatattacaa  169737797
ttaagacttt cttaaaagac tcacatgagg acctttgaga cttccctgac  169737847
cccagaagga aaaaattcca gggaatgatg agctgcctgc ctttggaagg  169737897
aaggtccacc aggtaagaaa ctggaggcca cagggatacc tctgggctcc  169737947
ctggctggaa ttggcagatg ctggtgcaga tgccagggcc tcccctcaga  169737997
actccaacct gcatgagggc acctgggttc cagggatgca acgcagctcc  169738047
ctgcctggcc cctgtggctt tgagtggctg tgtccctcag cccttcacag  169738097
ctggctctgc ccctcagccc ttcacagctg gctctgcccc tcagcccttc  169738147
acagctggct ctgtccctca gcccttcaca gctggctctg ctgagttctg  169738197
tggttgagat gccaggtact ggaacacaca gctccaggct tgagtcctag  169738247
cccctcactt tacagatggc cttggccagt tacctcttac agcctcagtt  169738297
tttcatagta acttagatag cacttaccat atgtcactat cctaggaaat  169738347
ttacataaaa atttgtttca tgccaaaact ctatggaaag atactattat  169738397
cagtttcgtt ttgcaaacga ggaaacaggc acagaaaggt tattcgtcca  169738447
aagtcaccca gcttgtgaac agcacagctg gaatttgaac ccaaacagtg  169738497
cacatcccaa gtccacatac ttagccactg tcctctgttg cttctcatca  169738547
tctgtgaggc aggttcagga gtatctcatt tttttttcca aggcaaacta  169738597
attagtacag tgcctggcac agaataaata agcacccata catgccagat  169738647
aacattgtca gtataacttc tggaagtttc tgagtattca tgacttattc  169738697
tttttttttt tttttttttt ttttttttga gacagagtct tgctctgtta  169738747
cccaggctgg agtgccgtgg cgcgatctcg gctcactgca agctccgcct  169738797
cccgggttca cgccattctt ctgcctcagc ctcctgagca gctgggacta  169738847
caggcggcta ccaccacgcc cggctatgat tttttctatt ttttagtaga  169738897
gacagggttt caccgtgtta gccaggatgg tctcgatctc ctgacctcgt  169738947
gatctgccca cctcggcctc ccaaagtgct gggattacag gtgtgagcca  169738997
ccacgcccgg ccgacttttt cttgttacta acaatagctc tttttccctg  169739047
atcctctccc tcctcctacc tcccgccctc caataggcct cagtgtgtgt  169739097
tgttcccctc tttgtgtcca tgtgttttca tcatttagct cccacttata  169739147
agtgagaata tacagtattt agttttgtgt ccctgtgtta gtttgctaag  169739197
gataatattt ggcctccagc tccatccatg tccctgcaaa ggacatgatc  169739247
tccttccttt ttatggctgc ataatattcc atgacgtata cgtaccacat  169739297
tttctttaat aatgggtact agacttaata cctgggtgat gaaataatct  169739347
gcacaacaaa ctcccttgac acaagtgtac ctatgtaaca aacctgaacg  169739397
tgtaccctgc aacttaaaat gaaagttaag aaaaaaacac acacacaaaa  169739447
caaacaaaaa aaactatagt tgccatttta aacacctatg atgtgtcaaa  169739497
```

FIG. 1.9

cattccttca gccctcccaa ctatccagaa agagtccttc ttttatagat 169739547
gaaaaaacta agaatcaaag agatgaaatc gggcagagta gagacaggat 169739597
tcaaacccaa gatctgcatc ttggactcac aacactggaa gaaacttcag 169739647
acaccagcct aacttcacac ccagctcagg actggccctg ccgaatggtc 169739697
actcacctgc tctgaaaatc ctcgcgacag gacgctcact tcctacaccg 169739747
gtagttctct ggctcgaggt gtgccacaga atcccctacg cattgttaga 169739797
acacagaaca ttgctacccc caccccgtgc agggcttctg gcgtggtggg 169739847
gctgggacag gggcctgaga gtgtgcattt ctcacaagct gccacaggat 169739897
cctgatgctg ctggcccagg gaccacactt ggacagtcat cgttctagga 169739947
aaacttcctg gagtgggaat ggtaaaggtg atggcttctt cccattttgc 169739997
ccttttcaaa tctgagatag gcttccccag caggctcagt gccagagtcc 169740047
ataccctcaa tttaaataac aaatcctcct ctatatcatg acctttcctc 169740097
cagagggttg tttttcattt tttgtttttt gttttttttt tgagacggag 169740147
tcttgttcta tcaccaggct ggagtgcagt ggcacaatct cggctcactg 169740197
caagctccga accccgggtt cacgccattc tcctgcctca gcctcctgag 169740247
tagctgggac cacaggtgcc caccaccacg cctggctaat tttttgtatt 169740297
tttagtagag acggggtttc accatgttag ccaggatggt cttgatctcc 169740347
tgacctcgtg atccaccagc ctcggcctcc caaagtgctg ggattacagg 169740397
agtgagccac cgcgcccggc ccagaggggt ttttaagatt gtgtgttctg 169740447
aatggcctgt ctctgactgg aacccaactc cgtccccaga cccacttcca 169740497
tctttttctg tgaggggac acactctttc aactttcca aaatggcatc 169740547
taccatggct tttctgatta aaagcaaacg aaacacaccc ttcctataat 169740597
caaaaattta gaaaagcagc aaaaataaaa aggggataag gaagaaaaca 169740647
gaaattaacc accatcccac cgctaaaatt ttgatgagtt ctcatgtgtt 169740697
tccttgcagc tgattgttgt ttggcataca tttattaata ttggaattaa 169740747
aaatatatat ggcactttat atcctagaaa atagtaatac tgtaaatgtg 169740797
ttctagaaat gggagctgct gttgctctta ttagagaatt caaacaaaga 169740847
agggaggctc gctggggaca gcttctgggg gaggatgggt accgctttga 169740897
gacaacaggg agaactcagg cacagaggtg acgatcatcg ttctctgtgg 169740947
ggcacatagt gatgcagccg gaaacaggta tgagtcagtt gagtggggac 169740997
aggtaataga gagctagaac tggctggcct tatggcctcc aaggcattgg 169741047
ggagccactg tacattcttg agcaggcaat gacttcacaa aaggatttct 169741097
caaaggttag tcctgcaaca gaagacagcg tggattggac tggaagagtg 169741147
ggagggcagg tggagaaggc attgtgctgc aagtggggag cagccctggg 169741197
ggcccagcca gtcccctgtg ccctgacaag tggtatggca tggatggatg 169741247
gctctacttc tgggccgcca ggatggacag gtactggttg ctcttcacca 169741297
tggcgataat gaggaggcca ccggtcagca ggaaggtggg ccagaagagg 169741347
gagaagagga gggcctgggg cccgtagagg cgctggaata ggacgctggt 169741397
ttcgttcccc cgaggtgcgg agaagcagta gaagacctgc tgctcttgga 169741447
atttggctct gaccttctcc acgtcggccc gggccgtctg gtaattgtcc 169741497
acgctgcctg ggatgtagga gcactgtggg gagaaacaag agcagctgtg 169741547
ggcttggaaa tccccatttc ttagccaagg gcttgatatg gagtaaagaa 169741597
aaataccagc tttgtagtcg ggcccctgga ttggagtcgg ggctttggtc 169741647
taaagcttgg caggccatgc gctgtacagg tctggagagc acgctctcat 169741697
ttgtgtcttg tgtgtggatg gcggtgctgg agctgctcgg ggtacaggct 169741747
acacacctgg gcgcaggtcc taccttggag tcctggctct gcttggattg 169741797
gctgtagaat ttttggcaaa tttctcactc tttctgagcc ctgaagcttc 169741847
atcacttaaa tgggtgaata tcggtttcaa aggatattat gaaagaagga 169741897
cttcacacag agctatctaa ggaaaccagg gagggacaca ggccaagtgg 169741947
gctgtgtatt tgaaatcgag atcatgtgct caattgccta cagggctcat 169741997
gaaggtattg tcagagggtg aagcaggcaa agcaatgaga tgacaggtgc 169742047
ccactgactc ttgccttggt gccaggaaga attgccaggg tgtggcaggg 169742097

FIG. 1.10

cctgtcaata gggagagagc cagctgcctc cagacaggca gtcaccactc 169742147
cctccaggca atggatgtca ggccatccag aagatctata atagccagac 169742197
ctccaacact ttaagagaag ttagaaacca gatcacacct gtaatcctaa 169742247
cactttggga agccgaaggg gaaggatccc ttgagcccag gagttcgaga 169742297
ctagcctagg caacatagca agactttatc tctacaaaaa aagttaaaaa 169742347
ttatccaggt gggcatggtg gtgtacctgt agtcccagct acacaggaga 169742397
ctgaggtggg aggatcacct gagcccagga gttggaggct gcagtgagct 169742447
atgatctcgc aactacactc caggtaaggc aacaaagcga gatcccattt 169742497
caaaaaaaaa aaaaaagtaa aatattagct aaatttaaaa ttgaaaacct 169742547
ttgcagtttc aacctgtgta cagcaaacaa actatgttgg caagcgggta 169742597
tttgacactg ggatccaaag gaaagaaaga atgcattgaa aagagttttg 169742647
tgccagcaga gcatgacaca catttaattc tgacgttgat tattgttatt 169742697
aggaactttc tgccctgttc agatgaggcc agctggaaag tgatgcaaag 169742747
cagtcataaa gcggagtttt atctggtttt atctctgttc tgagctgcaa 169742797
gtgtggtgcc cccatctgca gcagaatacc tacagggccc ccatagccca 169742847
ggtccctacc cactctgcat cactgagggc gagacccagg aatgtgtgat 169742897
tccttcatgc acttaatttt gccctagtga aatcatgtgc aagatcaaaa 169742947
tgtgtaaaac tgagacccaa atggcaggtg ttgagccaga ttccttgcag 169742997
gcctcggcca ctccctggat ttatatgagg tgccaccctg gaagctgcct 169743047
gccctgaggg cattcactcc agcaacacag aggagggttg cactgtagtt 169743097
ctcacagcct gggaaatgca gatgctgcac tcagatctag ggccccagcc 169743147
agccagggag tagctgaggc tggggagacg ctggctcctc aggaatctgg 169743197
cattcagagc tgttggacac tgccaggtcc tcagtagcat ataatccagc 169743247
atcctgagct gacggtgagg gggcctggcc tgagtctctc caatgcctct 169743297
gactgtgacc ttggctaacc tagctcctta aatagcagtg tggctatgga 169743347
gtcagacagg cctgagttct gagctgtgtg accttggcaa ctgccacaac 169743397
ctcactgggc cttgtaaaat gggtttgtga ggctacctgc ctaggagaac 169743447
tgtcatgggg attaaatgag atgatgcatg taaagcactg agcacagaag 169743497
cccagcacac gataagaact caaaaaagtg gaagatgcta ttattaataa 169743547
taatatgttt tgacttatct atgaaattgc aacaacagct ccttctttac 169743597
cttcttaaaa agaggtctat ggatgagctc tgaagtagag gcttctgtcc 169743647
atcctgggcc tagtgtatcc tctgcctgct cagggttcct ctggatcttt 169743697
tatgctgggc ctgtttggca agacactggg caggaattca ctcttcatgg 169743747
ccaaacccag aagccggggc ctgaatgcat cctttctctc ctgtcctggg 169743797
tccagctaag cctgagttat ctgaatgatc tgaaaccaac cagctttttc 169743847
ccaagccctg cagtgtaagg tccccaggac agacaatggg agggaattta 169743897
gaactcacct gctccaggct aagactcaca ggaaaagctg agggcagact 169743947
atggccccta ccttcagagt tggagggtgg gatgagagtc ttcttggccc 169743997
ttcacagtga ttccagagga caccccagcta gcctggagcc ccagccactt 169744047
gaacccctat gatggacata ggcggaagga gcagctagcc cacaacccag 169744097
ctgcttggca aaaacacgaa gggcatttcc actgcttcct cccagctcct 169744147
gcagcctgct atcagcacca cacctggtca agcctgggcg gcaggggaga 169744197
ggacagcagt ggctccagca tgtccttcct tcacatcctg ctgacagttc 169744247
attcagggga tgctcctctg agctggcaat ctcaggacca gggaggcagc 169744297
ctgaaaacca gcctgctctg gcccatatca ctcccggaga atgttaccag 169744347
ttattgaaaa tttgtttctt gcattgggat aaatcaaggg ctactgaatg 169744397
ccaacgcaga ggcaggggtc atgggtagga gctgcctcca gtgggccctg 169744447
agacctctct ccaccgggtg gggccgagtc atactagcga tgacagaaca 169744497
cctgaccatc ctgcactgcc cagacccact tctcattgac cttcagcact 169744547
ctcaagatcc cccagcctcc acgccccatc ccaggcaccc tgccccttcc 169744597
cgtcccatca gccatcaagt ccggactgtc agcatctccc ctgctgcagg 169744647
ccacatcttg gtcgtgagtg cttgctgcgg ccttggctcc tctgtctagt 169744697

FIG. 1.11

```
aactggaccc acacacctgt aggctccatc ttcccagccc aactctgaaa 169744747
ctctgatcat gccctaaaga ttcccattgc caacagcaat aatttccaac 169744797
cttagaatca ccttgggagc tccatgaatg gatctctgac cagagattcc 169744847
accttgatat gtctagtgtt ggaccctagt tttgtttttt aagactctta 169744897
cagggttcta atgcatagcc aaagttgaca tatcttgaga catacacact 169744947
cacattttaa ttccatattg tggtgatcaa aggcctctgg gaacagacct 169744997
tagtctgccc tgacagcctt ttccagctgc atacacccca tcatgggtca 169745047
ttttctgtag tcagccctct gatccctgtc tccacctagc ccttccctcc 169745097
gccatgcctc gtcctatagg catacccgct tcctatatca cctcattctc 169745147
tatgccttgc atcctgcgcc tgcctgatgt taaaagccta atccaagagc 169745197
ctttcttttt tttttttttt tttttgagat ggagtttcac tcttgttgcc 169745247
aggctggagt gcaatggtgc aatctcacca agagcctttc tgataccccc 169745297
atcattgtca gctggaaaac atccccctcc tctaacccct gtaacttcct 169745347
ctgttcttct ccccggtgcc aattcttccc tgctaggcac tgttcatgca 169745397
tgagctctct cctcttgagt cctacaggct tgacacagga ggtgctcaat 169745447
ggctgttgaa taaataaatg agaggaggaa agaaggaaac aaggaaggaa 169745497
ggaaggaagg aaggaaggga gggagagagg gagggaagga gggaggggaa 169745547
aaaaaagaaa agaaagaagg agggaagaaa gggaaaaaag aaggaaagaa 169745597
agaaggaagg aagagagaca gaatatgggc caactgatcg ctttaggaaa 169745647
ggatatggtg gtgagttttg tgttttggag ggggagggtg ggatgttggg 169745697
atgcaaggat ggaaaaacca tctaaatgtt tgtttatgga ggttactcca 169745747
gccctgagtc cctggtttcc tggggagtca ccgggattcc actttgagga 169745797
tctggccctg ggcctggtcc ctcatttgac tgaggttgta gaatgaaagt 169745847
actaacacta atcactgctt ttgtttgagt gcccactatc cactcagcat 169745897
caagcgtggc actttatata cagcgtctct gacttgataa cagctcttca 169745947
aggtgcagca ttagcattcc actttacaag ggtggaaact gaggaggtga 169745997
gaggctaagt ggcctgccta tgtttacaca gccagttagc ggcagattca 169746047
aacccaggtc tgtgtgactc caacacagaa gagctagggc tggctcagtc 169746097
tcattccagc tgtgagacct ggtcaagtgg gttgatcttt ctcagcctcg 169746147
gggacaggga cagttaggaa caggctcaca cacctgacag ggataaaggg 169746197
atgtgtcccc atccctccag ttcagtacct gctggttctg gtcccgagtg 169746247
tcctccgtgt ggtacagcac agcccacctg ccggcagctg acacgttgac 169746297
ccacaggcat gggtactggg gcaccttctt gcccttcagc tcctcctggt 169746347
ccctgatgtt ggtctcaatc aggtggcact tggattcctg ggtccacacg 169746397
ctgaggagac cacacacatg cacacataca catctcagaa ctgggtgaca 169746447
cacagaacac ccatttgaac ccattatccc ctgggagcct ctagagggat 169746497
ccaggactgg gatcctcatc ttgtcttcag catccagcaa taaaggcaca 169746547
tgaccccaca gtccccggac acagggagga attgtagaag ctggatgggg 169746597
tcttagacat tatctatatg actggttctc aaccttggct actcttgcaa 169746647
caacctgggg agcttctaaa aagattcccg tgtccaagct acaccccaga 169746697
gcaagtgaat cagaacttct tgggtggttt ggcccaggcc ctgggtgttt 169746747
tttcaaagct ccctgatgtg attctgacga gcagccaaac ctgagacttt 169746797
cttatccata tcgtcttcat tttgcagagg cagaagagaa actcagaaag 169746847
gtcaagtgac tttgctgaga ccttgcagga cctgaagcta ggtctgagtg 169746897
ggttggagag ctgtgttctt tcccctaaaa ggagcagatg tagaaggggt 169746947
ttgagttgag ccaggatggg aaagatggtg gggacagtct ctagatggtg 169746997
cttcaccaga ttaagagtcc agcctggaat cgcttcagcg ttgtgaagag 169747047
tgaggctgca gcaggcccgg gagaggctaa caggttcatc aacatattag 169747097
taaatcagtt gtgcttcaac tcccaagtat cctgtgggag acccattgcc 169747147
agtcagaagg gggctgtcag ctgctggaac gtgcccagag cacaggtctg 169747197
agacttatcc taaggacagg ctgggggaac tgagtgtctt tgttccaaat 169747247
agaacacgaa ttaggaattc acagcttttc cttaaaatct caagtggttg 169747297
```

FIG. 1.12

```
atatgtcatg gagcaagggc atggaccatt ctctgagatt cctgagcaga  169747347
acttcaggga agcagatgct ggctcaatgc agacacatca gaaaacctca  169747397
aacatgaaat gtatgttcag tgaggcaagg agctccccgt ctcttgaggt  169747447
attcatcagg aggctggatg cccacctgac agggaggctt cagaggggag  169747497
agaattatgc agctgagctg taaacatctg caattctctg attcctcctg  169747547
ggatcaaact tgcactggaa cctttgctct gattctttgc tatttcttct  169747597
gagaagggca tcatgtgtct gttaccacca cgtcctagat catgtgtctg  169747647
ttaccaccag gtcctagaat ctcagaccag tggggctcag ttcatcctac  169747697
cttccctgca cttgaaccct agaacctaag aatgagcatc gtcttgaccc  169747747
tgctgccttg aatgagggtc aaggagaggg gtgagtagaa ggccagggtt  169747797
ccttacagat gccagacccct taggagaggg ttgggggtg ggcaggccgg  169747847
gagagctcag taccttttct ggtagagggg cagcacagtc gtgaccagga  169747897
tgtagtaggt gatgacggca cacaccacca tggttacacc caggcaaagg  169747947
gctcgtgtct ctccccgctt ctgggccatc accagcttct tcaccatatt  169747997
cactgggggc agtgatcatt tctaggtcca cagaagcaaa cagaagtgag  169748047
atcagcccag ttcacaggtg atccacagaa agagaggaca ggtgagaggg  169748097
gaaggtactc aactattaat atcactcttg tttatatttg gagctttgca  169748147
acttccagaa gtcttgcttt ttggacccca tgtaagcctt ccctgtgcaa  169748197
ttgagaggca attgcagata aaagacctac ggctcagaga ggtaaagtga  169748247
cttgccctag gtcacacagt atgtaatagg ctcagtaatg gccccccaag  169748297
atgtctatgt tctagtctct ggaagctatc aatgttactt tatgtggcaa  169748347
tgactttgca gaaatgatta agataaaggc tcttgaaggc caggtgcggt  169748397
ggctcatgcc tgaaatccca gcactttcgg agaccgaggt gggcggatca  169748447
tgaggtcagg agatcaagac catcctggct aacatggtga aaccccatct  169748497
ctactaaaaa aaaaaaatac aaaaaattag ccgggtgtgg tcgtgggagc  169748547
cagtagtccc agctacaggg gaggctgagg caggagaatg gcatgaaccc  169748597
aggaggcgga gcttgcagtg agcagagatg cgccactgca ctccagcctg  169748647
ggcaacaaag caagactccg tcaaaaaaaa aaacaaaaaa caaaaaaaga  169748697
taaaggctct tgaaatgggg agacaatatt ggattatcca tgtagctcct  169748747
aaatgtaatc ccaagggtcc taataagagg gaagtgaagg gagattaaac  169748797
agatgagaaa gctaaggtga tatgaccagg gagacagcaa ttagagtgat  169748847
gtgaccacag gccaaggagt gcgtcagaag ctggcggggg caaggaacaa  169748897
tggctcatcc cccacggcca ctgcagggag tgcagcctgc agacaccttg  169748947
gtgattttgg acttctggtg aaatttctgt cgtttgaggc cgtcaggttt  169748997
atgatcattt gctacaacag tcataggtcc catgcggtga gcgagcagta  169749047
catgtgcatc atccatgcac ctccttccac ggcacttatc tcacagggat  169749097
acttggagta tttctgccca gaaacagttc tgtggcaggg ctagctgggc  169749147
cgggcacagg cagggaaagg agaggagggc cccagaaggc agctgcaggt  169749197
tgtcaggaga ggcaggaggt ttaccatatt ccggtgtttt tttttttgt   169749247
aaggaacatt cccctacttc aagcaaagaa agaagaaaga aggcatcatg  169749297
gtggcctcag cgactgcttt cttatttcag ggcttgaagc cacctgggac  169749347
aaagcagaat gggcacattc tgctggtggt tgctttcctt ctctcctctt  169749397
tctttaggca gcaactcctt gtttttcccc tggacattga ctccacccca  169749447
atgcaagcaa agattccacc ctcccctgct aggctcctga tcgctccccc  169749497
aggagtgtga gtcttgacaa agacttcaag aaacagcccc tcaatctatg  169749547
ccgcctggag ccacagagat gcccagccat ggtccccgcg tgatttccca  169749597
tggttccgca agctgtccta gagcctctgg taaatttatt tgctgttgtt  169749647
tttatttgtt taaagtaacc agagtccatt tctaccaaaa ataccaggaa  169749697
gctatcaatg taatcctcca ttttagggga aattttaggg gaatttaggg  169749747
gaaattttag ccagatatca gggggacttt attctccttg ccaggtccct  169749797
aaagtaataa acatattatg gtttttgttt gtttaattag ccagtgtccg  169749847
ggtgacaggc cttagtccaa agagattttc tgcaaagtgc tctattttct  169749897
```

FIG. 1.13

gctcaggcgt ctcttaacta ctagactgtt tcaaatattc agagattctt 169749947
gactccctcc ccttagccag gctgccctca tacccgggca tctccgctaa 169749997
agggaagaga ccagggtcag gcaccacgga tacccatcac accttcccag 169750047
tgagctggtc cacctcccct atcgatcggc agaggtgaca tccaatgaca 169750097
actttttctc ctttatttgg caccaggagg tgagtttctc ctgcattcta 169750147
atggagacat tataaaagca caagcaagca gaaattgccc ccgacaaaga 169750197
gagatgtttt attcaactct ttttattcaa tccttttcct cctgttctgt 169750247
gatcttgtgg gaatgggaga gcccatgcct ttttctacct ggcgtcagtt 169750297
gaacaagact ctccatgtat tcacaggtaa agcaacagaa tcacctggag 169750347
gtaagctaaa agccccaaca gcctgcttcc ccaggacctg caagggtcac 169750397
tggcacttgg ccccacccca gatactgtga gacataaatc atttgaagcc 169750447
aatgggaaat cccatcttgg aagcctaggg ctgagtgccc acaacaaagc 169750497
catttctctc ctgggggaac tggatcgcac ctgtgggggc ttcctgtggc 169750547
tccttcctgg ctaatcagcc ccccccagcg cccagggcca tggcctcctc 169750597
tgctatttgg cttctagtgc cctctcaggc ccctgggcac tcctgaggct 169750647
ggtgaaggca ggaacctggt tttaccagtt ttaggagctc agaaggaaag 169750697
gaaaggagag gcttccctgt cacagagaag tctggaaact tggcttattc 169750747
aggtctgacc cgtctctaat ggtctgatga gattgttgcc tgcactgagt 169750797
gagtttatag agtcatgata aatcctccta agaccatgcg tggggttcag 169750847
tgtagatatg acttcagcaa gaagttagta ttcagcatcc aaagggagaa 169750897
cctttggcgg gaggaaggat gggaactgtc aatatccccc aagggacaga 169750947
aagaaaagga agaagtgggt ttcagctatc ataggaggga tttcagttag 169750997
actgtaagaa gaacttccca gttttgagca tttctaaata tctctgaagt 169751047
tccaggatat atcttcccat ttagaaaggt cacttgagat ctgggataga 169751097
ttcagagaag atggagaagg acaaaggaag gcaggacttt ggagtgtcct 169751147
gggtgacctg atagctgggt cgacatcctt ttccttagaa ggacaaggaa 169751197
tagagtacat tgttgaacag tttggtgggg tgtggacagg gcgattctga 169751247
ggtcctcaga catggaatca aatcctggct ctgccactta cacttagcaa 169751297
ccacatgact gtgaaacgag aaccatggta cctgcctcag agagttcagc 169751347
taaagatcaa atgccatatt gagtatcaga catgtatcat agcacctagc 169751397
cccaaatcag cccccagtaa atattagcta ttactactaa cgaaggaaac 169751447
cctgaaagtt tggagcagaa gtctggaccc ctcttgatga atctattttt 169751497
gtcccacctc tctaccggtg acaagtgcca gcattggtgt taatctccag 169751547
gctgcagcct tctggccact ctgagaactg ggacctagag ggccagggcg 169751597
cttactacca gagtaacctg gccactgtgc caccctcccc actggccacc 169751647
agaccacggg ccctccatcc agaaggacag ccccgagagg aagggagtcc 169751697
tcctgcctgc ctccctccct gccccgtggc aggctgcttt cccctgtctc 169751747
cctccagccc ggtcttcaga gaaatcactt cccaagtgct ttcaggcccg 169751797
gtactcacag tcttcccggc gtcctgtggg tcttgagcag cagacagttt 169751847
ctttctgcct ggaccccccgc ccccacccca aaagaggcca cagagcttca 169751897
gcaggaagtt tggcctcccc gcccgtctcc agggaagcag cttttggtcc 169751947
ccatctgggg caagcctcca tgcccaaaca tggtcaagtc tgagcacaca 169751997
gcctggagac acagactcgg agagcaggta cccagccctg aggaaggcag 169752047
ctgttaccca agccctgcac ctccatcttc ccagagtctc gtgggaaaca 169752097
gatttcaaac aacaacagac agcaagactg agaaactacg aaagatcagc 169752147
ctggtatatt tggaaatatt tcttcttctc tctgtctctg tgggctggca 169752197
aagatgccag aaataggaaa tgattctcct tttgttggca tgaggaaggg 169752247
tggagttggg ctggaggggt tgggcttgtc actagtccct ggcatatcca 169752297
cgctggagca gctacagctc cctgcctttg gcacttacgt gctgtgtgac 169752347
cctgagcaag ttatggcacc tctctgggcc tcagtttcct tttttgtttt 169752397
tggttttact cccaaactta tcgttaaatg acctcagttt tctcacttgt 169752447
gttactggca tttttaaaac ctactttgct ttagggtagt gatgggagtt 169752497

FIG. 1.14

agagacggtg gggatttatg gcaaggggag agaactgact ttttaaggac 169752547
caactgagct gaagctggga gtagtgagag ctccacaact gcttccaacc 169752597
aggtccaggg acagtctgct caccaggggc cctcccagag accgcgaaag 169752647
tacagagatt tcttcctagc aataagacaa gtgaatgtca gcatttgcag 169752697
gcaaaaaaca tgcttttaga tctctgcttc ttcatctgta aagtggaagt 169752747
aaggattaaa aatcagcaac aaagggcagg cacagtggcc cacgcccata 169752797
atcccagcac tttgggatgc caaggtagat ggattgctca agcccaggag 169752847
tttgagacca tcctgggcaa catggcgaaa ccccatctct actaaaaata 169752897
caaaaattag tcgggcatag tggtgcatgc ctgtggtccc agctacttgg 169752947
gaggctgagg caggagaatc gcttgaacct gggaggcgga ggttgcagtg 169752997
agtcaagatt gtgccactgc actctagcct gaacagagcg agaccccgtc 169753047
tcaaaaaaaa aaaacaaata tatatatata tatatatatt ttcaacaaaa 169753097
caacaaaaac aatcccagat attggggctt tcctaagtat caggcgtggt 169753147
ggtagaaggc agcttatctc caccccttcac ttgacccaag aatcaaagaa 169753197
cctgaaactg agacttggag gcttgaagtc actggtgcaa ccctaggggc 169753247
cagaactaga ttcgaagctg gcccttccag atggcacagc ttggtctgtc 169753297
tctgatgacc ctggggctgc tctgagacat taaaaatcac ctcgatcata 169753347
cagtaagctg ccacctgagg ctctggaggt caccctgagt ttccccagcc 169753397
cccagggagg tgggtgcagc ctggccttcc ctgctgagcg agctcaccac 169753447
cttcctccct cctgcctcca gcaggcgcga aatgaaggca gccactcagg 169753497
cctccctgac acactctcag gcggtgagtg cccttctcca cccctttcct 169753547
aattgaatct tattaacagg agactacagt gtctgtttaa tgggcaccat 169753597
agcaccagag ggtctaagac cagcttcaga ccttgcaggc agattgacag 169753647
agggatgtag gatctggaat tcaatctcag aagagcaatt ttccaaggat 169753697
gatcctctgt ccactcagaa gcaggaaaag tcctcctggg gctaatccag 169753747
aaatgccagg ccccccctcct gcttccctgg gggagagata cacagtgcaa 169753797
caggctgcca tttatgagta taaccgaagg gctccttgct cgtgatactc 169753847
tgaataagtt attaagggct acatattatt tggaaatcat aaacaaactt 169753897
tagcattctt cccaagggaa ggtgggaaca aacagggaag gggggccgtg 169753947
gggtcttctg ctccccctaa atgagccaca accaaaaggc attgacaagc 169753997
cctgtcctcg agggtttgtg ggtgaaaacc caggtccttt gctggctgcg 169754047
gggttgtgtg tgacagatgg ctacaggtgg agggcaagaa aataacaatg 169754097
ctgcaacaat aaatattgac ggtttgcatt agtacggggt gtcagagatc 169754147
acaaaatatc ttctctgact cttccaacag cttcttaagg tactagcaca 169754197
ataggctcac aatagaccac tgaggtggag atttttctac ccatttgata 169754247
gagggagtaa ctgagcctca gagaggtgaa ataaattgcc caagcaagtt 169754297
actttgcctc tctaagcttc agtttgtctg tctctaaaat agagataatt 169754347
atacctagcc cctcagtgtt tttgaggaat gagagatcac ctaagctacc 169754397
tgacacatag tatggagatt gtcctttcca aagatggtca caccaaatac 169754447
ttcccattcc atgtgccctt ttcacagtgt ggcatcaaca ctccaccatc 169754497
aagaggggca ttgatgtctc ttccccttca ccctgggtgg agcttcgtaa 169754547
gggcctcaat agtagaatat ggtagaagga cacagcacga tgttcaaggc 169754597
taagtcatag acgggggctc gagttccccc cacacgctct cgggacatgt 169754647
acctgggaac cagccaccat gttgtaggaa gccgaggccc cgtgctccag 169754697
ctgacagcct cagctcagat ctcagccaac agctagcaaa tctcaccggg 169754747
catgggagag aacaagcctg cagacagttc cagcccccag cctgccagcc 169754797
tcccagctga ggcctcagag aatgtggagc agagacagcc cacctgctct 169754847
gtgctctctc tgaattccag agccacaaaa tccacgagaa gaaaaaaact 169754897
aatgtttcat gcccctgcgt tttggggtaa tttgttatgc agtcatagta 169754947
actggaacac acttgcaagt gatttcaaag gggactgtt acagttgctg 169754997
gtgatagtgg taggattaaa ccagtgagaa ttaaaacacc tgagattgct 169755047
atatggagtg ttacaggaga gtttagaaat gctttatcta ggtagggcat 169755097

FIG. 1.15

```
ggtggctcat gcctgtaatc ctagcacttt tcgagaccaa ggcaggcggt   169755147
tcatttgagg ccagtagttc gagaccagcc tggccaacat ggcgaaaccc   169755197
cgtttctact aaaaatacaa aaattagctg ggcacgatgg caggtgccta   169755247
taatcccagc tattctggga agccgaggca tgaaaatcac ttgaatccag   169755297
gaggcggagg tcgcagtgag ctgagattga gccactgtac tccagcctgg   169755347
gcgacagagt gagactccat ctaaaccaaa acaaacaaac aaaaaaagtg   169755397
ctttatctac tcttaggtca cacactatgg cacaaatgga atagaagggc   169755447
agtgatatgg gagggtattt ttgtttatga agcacctact atgtaccagg   169755497
gaatgaccac atagatatgc aatacataca catacacata cacatggaca   169755547
ttcctctcca caatccccca caaaaggcct tgttctttct gtaaaagcac   169755597
aaggcaaagt gattttccca aggtcacgcc cctagcgtgt gatgtgatgg   169755647
agcctggagt gcacctgtgc ccgctgactc cacagcccgt ccctgcccct   169755697
ctgtcacccc atgactccct tgggagcagt tttcaagaga ccccaggttt   169755747
cttcatgatg tctgcttcca ctgctttcca gacaccctca gctcagtctg   169755797
taccсctctc tggattatgc acctgcttgt ttatttaagt ctttctgaat   169755847
caatatctcc tctctgctga cacttgggat aataagtccc ataaatcaaa   169755897
ttggcaactg agtcttgagc ccctgtgtgt gcctctctga gtgctgcagg   169755947
gatgggtgtt agtcactctc agtcctagcg aagctgtgcg ttcacagaca   169755997
tcccagcact tgctatgcag aggctctgga tacaccactg tgccgaggtg   169756047
actcagacac ggtcccttca ctgcagaaaa gcgatgccag atttcctcaa   169756097
ctacaaaaat acagaacaga aagtgaaaga tgtgttttaa atgagagaca   169756147
gtaataaaag gcagaggaaa taacggtggg aggtttttta gtagagttga   169756197
gatgacaaag tataacaaca gcaaaagtaa atgccgatat tacaattaaa   169756247
tggtcacaca acaagacacg acaaaaaaca tggtaaagtt gttccctgct   169756297
gtgtagggtg atactcactc ctttttcctc tgactctttt caccatattt   169756347
tcccttggcc tgattttcct tcctttatcc tgccatgctg ttaacataat   169756397
tgtaagcacc ttgaaaatcc tctttgagac aaagaggagc ataaataaat   169756447
aaacagccct gctgtctgtc tgtgtggtaa ggttggtttt tttaaaaaaa   169756497
tgctttttcc ttagtgcaaa tcatcccagc tctgtgggaa agtggcatga   169756547
tgtggaagtg cagggagaag atgaggtaca gtgttagcct cactgctcag   169756597
agagagttgc tgtaagagtg gtggtggcct tttcaacaca cataaaggaa   169756647
gcatgtgccc tctccttcca tggcacatgt ctcctctgtc cttgcctcct   169756697
ggccagctct tcctcttcca caggactccc cgctggggcc ttccctcgcc   169756747
cccagcccct tagccactct ccgcgcctcc tgggccaggc ggaagctctg   169756797
cttccgcatg ctgggagcac cgcatgcctc ttctgcagaa cacttcctcc   169756847
gcctgtaatt taacatttat tcatgtgcat cctccattaa catgtctcct   169756897
aacccaaggg taagctctct aaaatcaggg actggaaccg ttcttattca   169756947
ctgccgcatc tctagcgcca ggaggaataa acaaagatct tgcggttttg   169756997
ttgtcatcgt gctttggttt tcgggaaaaa aaatctctcg ctttttttaca   169757047
taacagaata ttataatcat tttcccatgc catgaaacat ttttcttctt   169757097
taaattgata tattatagtt tcacagttgt acataaaaca cttttctttc   169757147
ttgaatttta attatagatt cgggggatac acgtgcaggt ttgttgtgag   169757197
ggtgtaatgc gtgatgctga cgtttgagct tctattgatc ccatcactga   169757247
tagagtgaac atagtaccca aaaagaagat tttcagcctt tgccccactc   169757297
cctccttcct tttggagtcc ccagtatcta ttattcctgt ctttatgtct   169757347
gtgtctaccc ggggattagc tcccacttag aagtgagaac atgtgatatt   169757397
tggttttctg tttccgcatt aatttgctta gcataatggc ctccagctgt   169757447
atccatcttg ctgtaaagga catgatttca tcctttgtta tggctgtgta   169757497
atattccaag gtgtatacgt agcacactgt ctttatctaa tctgctgttg   169757547
ttgggcacca aggttgtttc cacacctttg ctattgtgaa tagtgcggca   169757597
ataaatgtac aagtgcaggt ctctttatgg tagaatactt tattttcctt   169757647
tgtgtatgca tccagcagtg ggattgctgg gtcaaatgat ggttctattt   169757697
```

FIG. 1.16

```
ttagttattt aagaaatctc caaagtgctt tccacagggg ctaaattaat  169757747
ttatatttcc accaacagtg taaaagcatt ccctttctc tgcagccttg  169757797
ccagcatctg ttattttttt actttttagt aatagctatt ctgactggta  169757847
cgaggtgaca tctcattgtg gtttaatttg catttctctg atgattagtg  169757897
atgctgagca tttcaaaaac atttttctag aaaggctata cagttttcta  169757947
ggttatggct aagtcgggat agatttcatc aaagccatgt tgtcagatat  169757997
ttaagaaggg tacttgcttc cctgcatgct tgtttgtgtt tagcggaagg  169758047
cagagtccgc ctctgctatg ggcagacctg ttttattctc taccccctgaa  169758097
ccacacccat gcccagatgt catttttcat gaatggacag gtataaggga  169758147
gactgtatct ataagcacaa agtttgggga ccagaacagg tggatagaga  169758197
tggcaacatc atagaagtgg gagatggtga caggttggca attgctcaac  169758247
cctgtcccag gcctgacttg agccttagtg agtgagagag agcaagagag  169758297
agaaagctgt tgttagggct tgtgggactc agaacacaag aaatgccact  169758347
ttgggaccta cgaagagggt gtttccactt ctgcttagct gtggccttgg  169758397
gcagtggccc tgacagataa tggccatcat tatcatctaa aatagctgca  169758447
gcaaaggtag actcctgtgt gaatcggtgt ccctaggtgt gctgcagctg  169758497
gctcacactg gcaccgtgag agcctttgca agccaagtgt tcaaccatca  169758547
ggagctgaaa atccaccaca gtgatgggag tagctatact gtggaaatct  169758597
acaaacaata cacatcaggg cttttgtctt tttggagagc tgttttgcca  169758647
gcacaccact ttagaggata cacttcaact gggaaacctg aggaggtatt  169758697
aggaatgaag gtgtggacag gttataggaa accacaggga acagtgacct  169758747
aggggctcgc aatgttggtt gagggctgag ggaagggagc tctgtccagg  169758797
atcagcagga gaatcttctt gagaggggat gctcccagcc tggggagacc  169758847
ctcagggaag gaactgggga atggactgct atgctcactc tcctggaatg  169758897
tgttgatgaa aaagccaaac tctgcaaatt atttgaagag atttgttctg  169758947
agccaaatgt gaggaccatg acctgtgaca aggcttcaga aagttctgag  169758997
aacatgtgtc catggtggtt gaattacagc ttgattttat aaatgttaag  169759047
gagacagaag ctacaggcag acatcaatga atacacataa gatttacatt  169759097
ggttcagccc agaaaggcag gacatctcaa atggggatgg attcaaagat  169759147
ttcctggtgg attcaaagat tcaaaggtgg attcaaagat ttcctgaata  169759197
gcaattggtt gaaataatta agttttgcct aaagagttga agtcaacaga  169759247
aagaaccacg aaggggggtt atggaaacta aggttattat tatatagatg  169759297
aagcctccag gtagcaggct tcagaaagaa taaatgataa atgtctctta  169759347
ccagacctta gaaggtctga ttagactctt agttaaatct ctctgggatg  169759397
agaaaaagac ttagaaaggg aaggggagtc tctgcagaat gtagattttc  169759447
cccacaaatg acaactttgc aggactattt caaaatatgt caaataaata  169759497
tagtttgggg ttaaaatact tgtttctttc agagcctgct atctgtcatg  169759547
tgatgctata ctacagtcag gttggaattt ggtatttatt actacaaaga  169759597
gtctgtttgt catcttaaga cctctgtttt aatgttaatg ctggtaagtt  169759647
gtgcctgaat accaaaggga ggaaggtatt ttattaagag gcatgtccaa  169759697
catcccctcc ccattatggc ctgaactagt ttttcaggtt tctttgaaat  169759747
ccccttggcc aagaggtggg atccattcag tcaatcaagc ggcttagcat  169759797
tctatttttg gcgtacagac ccttctgcag acacctgatc tcctttggtt  169759847
gaatccaact ggtagacaga caaagagctt gttgctgcag tccccagtga  169759897
tcagtttcca gggcagagcc agctagagag tgaggagggg tcaggagggg  169759947
cttacataga tatcagtcca tctccctgtg tatgtggctt tgggacagga  169759997
aaactaggta agagcaaaaa aagagggctt gagcacatgg ggactccctg  169760047
caaatccccc agaaatattt gtaggggtct gaaaggtatg taggtaggga  169760097
ctctaaacat ttgtaagtca aattttatgt ggctaatttg gagccccagg  169760147
ctggtaagag ctcaggaaac tcaggttcca taaacagtgc ctcattaaat  169760197
attctttgca taaaataggt tgatgaaaag agtcaaactc tgtaaaatat  169760247
ttgaagatat ttattctaag ccaaatatga gtgaccaatg gcccatgatg  169760297
```

FIG. 1.17

```
cagccctcag gagaccttga gaatatgtgc ccaaggtggt cagggcacat 169760347
cttggtttta tacatttttg ggagacatca atcaaataca tttaagagat 169760397
ggcttggttc agtccagaaa ggtgggacaa cttgaagagg gggctgccag 169760447
gttataggta gatttaaaca ttttctgatt ggcaattggt tgaaagagtt 169760497
ataatctata gaaagggatg ttggggttat aataagaggt tgtggagact 169760547
gaagttttat gatgcagatg aagcctccag gaagcaggct tcagagagaa 169760597
tagattgtag atgtttctta tcagacttaa ggtttgtgtt gacgttaaat 169760647
gctggtcagc ttttcctgaa atccaaaagg gaggagggca taatgaggca 169760697
tatctggacc cctctttcca tcatgacctg aaccagtttt tcaggttact 169760747
tttggaatgc cctggtgaga gaagggatcc attcagatgg ttgggaggac 169760797
cttaaaattt tatttttggt ttacgaatgt ttgcacactt tttgttattt 169760847
ccctagaata aagactggac ctccaagcca aaattctagg gcaaaaggtt 169760897
tctacatttt taagattttg gtatatattt cacacctttt accagaatac 169760947
cgataccaat tcttgtactc actgctggta gaggagactg gttaatttca 169760997
cacataatca ccaattctta acactcttaa atttggaaat atgtgtcttt 169761047
tggctaggtg aaaactcttt catctgtttt taaatttgct ttctttagat 169761097
tactagcaag attgtacagt cctttatatg ttcattggaa gtgaaatatt 169761147
ttatttgtcc caaattgtga tcaggaataa ataagaagcc cctgttttag 169761197
accattctaa ctgtcctttt tctctggcaa gattcagagg cccaatcttc 169761247
atcagctgct ctaagtggtt caggtcagga ccggctccag gggctgaatg 169761297
ccccacccca atccctccca gcctctcagc atgggcaggg ggttttgaga 169761347
ttataaacag gttattctgt aaactttctt tgctgagcca tagaatgtca 169761397
gccctctaag ggcccttaga ggtcatctag gcttgttgct ggaaaagagg 169761447
gtcctgatcc agacacctag agtggattct tggatctcac gcaggaaata 169761497
attcaaggag agtcacagag gacagcgaaa gaagcaagtt tattggaaac 169761547
tactttgtta cagagtaggg catcctcagc aggaggagga gcatgccatc 169761597
ctttgtgagt gtgtctactt gcaagaaatt agaaggagct ctacacttgg 169761647
aatgtgtaga tgtgcttacc aaaggtaagg gctattggtg ttatcaatga 169761697
ccatgaatct tttaccctaa gcctgctaac cgatgttatc tttaagtaaa 169761747
attggctgta ctcttaagat atccggacat tgtacaggct tgctgggaga 169761797
tgctctgtat ggccataaat attacataat tataagtggt ggtcagctta 169761847
gaatttggct attttcagac cattagcatt aaccttaaac acgctttgtg 169761897
aatgcctgcc tgctcacttc aatatggagt cactctagtc gcattttatt 169761947
aaaccagagg cctggtaaac aggggtttct ataacaggcc tacatgacca 169761997
ctttgtcctt gagtaatgtt ttctatttac aaagtaatag aggtaagtca 169762047
tagagaactt gataatacag aaaagtaaaa aagggggaaa ataaaaatca 169762097
atcaagattc aatatcctga ggaaaccaca gtcaaaatat tagtggatta 169762147
tgttctaaag attgatacaa atcctttcta aaaacaaact taggaatata 169762197
ctatacaatt taaaatgtgt tcttatttta aatagaaaca ctttccccat 169762247
ttatgtaata ttgcttttca aaataccagt acttcatggc cctataatag 169762297
tccatcatat agatatgtca taaaatgttt tactatttcc tcttctgaga 169762347
catttaagct attttccagg ttttgctatt ataaactact ctccagtgat 169762397
gatctgttca tgtcatcttt gctcacctct ctgattattt ccttccaaca 169762447
ggttcctaaa agcatgatca gagccaaaga atattagcca ttaaaagcct 169762497
ctgcctcttc tctttttctg gaagcatagg atctgataaa atacacacct 169762547
ctgttctgtt ggtgagccat gtgagctcag acaggtgcag tgatttgccc 169762597
aaagccacat agctttgtta gaccagggat tggaattcag gcctgtctcg 169762647
acagcctctc gtgagtgcca gaacccagcc aggagtccat gcttcctgac 169762697
tcctatgcca tattcttgcc ttattccttg cattagtccg ttttcacact 169762747
gctataaaga tactacccaa gactgggtaa tttataagca ccagaggttt 169762797
aattgactca cagttctgca tggctaggga ggcctcagga aacttacaat 169762847
cacggaggaa ggagaagggg aagcaggcac ctcttcacaa ggtggcagga 169762897
```

FIG. 1.18

```
aaaagagaga gaagcccagg ggaaattacc atttataaga ccatcagatc 169762947
tcatgagaac tcccttacta tcatgagaac agcatggggg agacttcccc 169762997
catgatccaa tcacccccca ccaggtccct ccctcaacac ctgggtatta 169763047
caattcaaga tgagatttgg gtggggacac agagcctagc catatcattc 169763097
ctctttgtag aatatttctc cactagtgag aactctcaat tactgatcac 169763147
caacatgtgc caagaactgt gctaagtact tgaactgcag tatctcattt 169763197
gatcctgacc ctttgaagtg gttactgtgg ttatcctaat tttatagatg 169763247
gggacactga ggtggaaaca cagcatttct tgtccaaggt catgatgtta 169763297
gtaccttaga gccgaaaccc ccattccttc ttgtctgagc agtgtggtcc 169763347
aaacagaact ttctgtggtg gtggaaatgt tctataactt taagccattc 169763397
gatacaatag ccactagcta cctatggctg ttgagcactt aaatgtgaac 169763447
agtgtaagtg gagaactaaa cttttaacct taattaatgt aaatggaaat 169763497
agccacatgt aactagtgat attggatagg tatctctgga gccttaagtt 169763547
tccctgttcc ctccatcata gcctgactca ggcagctctg aagagggctc 169763597
ccctaccatc cttggacctc agcctggggt gggactcaga atagccctcc 169763647
taacacgcct tgctaatcct gagccagaga ctctctctga gccaggacct 169763697
tgtgcctgag acagattctt cagctgccta cagggctggc agtcccagga 169763747
gctacttcct gtgggcattt acaaagacac actgcagaga gaggcttttt 169763797
aatccccttt tgttacacat taatgaaaat gtatgtctgt aatccataaa 169763847
taataagatt gctcctgcaa agctcaaggt ctacatttac actcagagtg 169763897
aatattatta tgaacttcac tagaatcttc tctgggagtt ctcagcagag 169763947
caccatctcc cagaagactc tgtctctaag gagggaagtg aaggagcata 169763997
aaaggactga tttttaaaa atcagcattt aatctgggca cggtggctca 169764047
tgtctataat cccagcagtt tgggaagcca agacgagaag attgcttgag 169764097
cccaggagtt ctagaccagc ctgggcaaca tagtgagacc ccatctctac 169764147
aatttctttt aatgagccag gcatggtggc gcatgcctgt ggtcccagct 169764197
acttgagagg ctgaggtggg aggatggctt gagcccagga agtcaaggct 169764247
gcagtaagcc gtgatttcgc cactgcactt tagcttgagt gacgttgaga 169764297
ctctgtcaaa aaaaaaaaaa aaatccctca taatttactg agtgccttct 169764347
tcatgccagg ccctgcacta ggcctggcac atggctccct acggtacttt 169764397
catagagttg ctgtgacaca aatcactaca aactgggtgg gtggtttaaa 169764447
gcaacagaaa tgtatttcct cacagctctg gaggccagaa gttcaaaatc 169764497
aagctgtcag caggcccgtg ctccctccaa aggctctaag gggaaaatcc 169764547
ttccttgcct tttccagctt ctggtagtgg caggcactcc ttggcttgtg 169764597
gctgcagcac tccaggctct gcctctgtct tcatgtggcc ttctcctgct 169764647
ctgtcagtgg cttcttctct cctgtctctg ataaagatac ttactgttgg 169764697
atttagggcc cacccaggta atcaaagaag agctcaagat cctttgttta 169764747
ataatgtcta caaagactct ttttttccta ataagatcat attcaaggta 169764797
ccagaaattt ggacatggac atatcttttg tggggacccc attcaagtca 169764847
ctatactcat cttattcaat ctatataaca actctgagag ggaggtgaat 169764897
tagccacgat ggactaactg ccgcaaccac cccaaggttt taatggtatt 169764947
atacaataac agggcatttc taactcgtgg gaagtccaat atggatgttc 169764997
ctgcttggga ggctgtcctc taggtggttg ctgggggaac caggcttctt 169765047
ccatctgtgg ctgcaccatc ctgtggcctt gaggtccccc tggagttatc 169765097
cagcaggtag actgggagca ggagaggcag agagagcatg tgaatcattg 169765147
aacatctgat acacagacac attggcctgg aagtgacata cgttactgat 169765197
ccttacatcc cattggtgag gactagtcat gtggtctgcc cagctgcaag 169765247
ggagtctggg aaatgtagcc cctgaaggct cagtggcttc tcagcatgag 169765297
tatcacactc ttgggatgga ggcaggggga aagcaccaca ccttgttggt 169765347
cagctggcca cggctgccac agtgtcattc atttacttat tcttcattca 169765397
tgtaattcat tatttcactc atttttcaga agagaacttt gaggctcagg 169765447
aaagttaggt gatttcactg tcacagagca tttaagtcac agttcaatta 169765497
```

FIG. 1.19

```
ttatttatta aggggtgctg aattaggtgc ccctcgttca cgtacgcctg 169765547
ttccatcttt ggatttaacc cactatatga tttatctata tgcgtgccag 169765597
gaacatgatt ggtaagactg atttacacca cctcccaaat tgtactttgg 169765647
ctctcagttc tcctccctct ctcatttgtc cctttggaga atgggtagag 169765697
agagctagag ctggaaaggc aggaggcaga gaggtaccag agataagagc 169765747
cagaaaggga gggggtgaca gaaagataga aagaaactcc acgtgggcca 169765797
gatgtcctag aaaagttttc ctagtttgac atgtatggga ttttggagca 169765847
gattcagtta ggaaagattc aagagcagag gaaaaatacg agaaacataa 169765897
ctgagaattg tgaacatgat cttcttttat gtgtttatgg aaaagcagtg 169765947
actttcttct gaatttgttt aaagtccttt tgtgtgctag actgtacatc 169765997
ttgactatga ccccatacag agggatgggg ctgtaggcag catgaccaca 169766047
ggtccccatc agccatggaa aggccctgtt tactcctgtc atctcctttt 169766097
actctcaaat gtgccctagt ttgagtaaat gaagtggcca tcctaacttt 169766147
ggaggacagt ggcttttgag tgtataggtc tccttcccaa ggccaagtgc 169766197
tcctctggga tggaagccgt ggtcagctta tctctgaatg ttcaggcata 169766247
gctcaggccc taatgcatag caggtgccca agaaatgaat gcagaagcca 169766297
ggaagaaccg aactatagtt tgagctcagg cctttacact ccaaatgcca 169766347
gattcctcct actacgccgg ctttggttga ggagctcttt gaacacagtg 169766397
aagcaattaa agagtgactc ctggtgtgga gccacctgca ctgcatacca 169766447
gagggattca cagaggggag ctgcatattg tagtagaaaa cagctcctaa 169766497
gcttcccact tcagagcctg tggggaagaa gcagagtggg gctgaggacc 169766547
gccctccaga aaccactgtc ttggtcctgc actagagcac atggcttaag 169766597
tctcctcctg catctcttgt gggcaggagg caggggatta taatgaggtc 169766647
ctaactctga acacaaacat gccagagagg tttgaattag aactctccag 169766697
agaggaaaat taagcttcag gttttagttt ttaaaatgtg catttattta 169766747
tcagtgtaaa tagcttaagc acagtcttaa aaattggaaa ctaataaaaa 169766797
atcatctata attctaccat ttaataaatg tactatgtgc atttataaat 169766847
tttttttccaa gatttttttt tccctttgta aatggttttt ctgtacatag 169766897
ttatcatcat aggctgttgt attggttatc cattgctgtg taacaagcag 169766947
cctcaaaatg tagtggcacc agatgctcag gattctgctg agtggttctt 169766997
ctgggctggg ctaggctgat ctcagctagg atcactcatg tacttgcagt 169767047
cagtcggtcc caggggcctc ccttgtgtca ggtggttgcc tggctatcat 169767097
gggtgacagg ctagtgacta tgccatgtgt ttctcagcag gctagacgag 169767147
cctgttctca tggtgacaag atgcagaagc agtagggaaa gcagaagctg 169767197
caagtcctct agaggtccaa gcttgaaact cacactgtca cttacaagca 169767247
tttgattggt ccaagcagat catgaggcta gcccagactc agtggggtaa 169767297
agaaagttta tttcttgatg gaggaactac aaaatattgt ggccattttt 169767347
gcaatctatc aggactgcgt gaagtttttt acctttccat ttttaattta 169767397
ttatcgcatt atgatttttt ccttactaat acaaaggatt catgacatta 169767447
tttggatagt agacagacta cagtttactt aagcatctcc caattattaa 169767497
acataaagat gacttccggt tctccagcac ataaataaag ctgcatggaa 169767547
catcttgatg cagacaggta tttctgtaat tttgattgtt tccttgggat 169767597
agactcccag aagtggattc aaccaggcat aaatggtttt tgatattctg 169767647
ataaatgaaa gaaatatgga ttaaataata catatgccaa attgccctgc 169767697
aaaattatgc tgctttacct ccagccacag agagaaaagg gattttcttt 169767747
tcttttttttt ttgagatgaa gtcttgctct gttgcccagg gtggagtgca 169767797
gtggtgcaat ctcggcatac tgtaacctcc gcctccaggt atcaagcgat 169767847
tctcctacct cagcctccca agtagctggg actgcaggca ccaccaccat 169767897
gcccagttaa ttattagtat attttaattt tttagtagag acagggtttc 169767947
gccaggttag ccaggctggt cttgaattct tgacctcagg tgatctgctc 169767997
accttggcct cccaaagtgc tgggattatc agcctgagcc gttgtgccca 169768047
gctgagaaga gggattctca gcagcagcct ggactcaggc atccttgcag 169768097
```

FIG. 1.20

ggcctcctgg cttctcttga ttcattttgt tttcctggtg cctcatgcca 169768147
ggaagctgga atgaagcaca actgggcaga cccttccttg ggcaaaagta 169768197
ttagtgtctg tggtcattgt tctctgacag tcagttctgt ggtacataac 169768247
gattggttca ggcccctgtg atcttcttgt ccatgtgaga ctggatgagg 169768297
agtctcctgg accagtgatg gtaacacctg caccctgagc tggggagcag 169768347
gtggtatcac agacgagctc ccatcccagg ctggctctca cagtcccttt 169768397
ccacagctgt gttaccagcc cctgctcaat catgtttcca tgtgattctc 169768447
atggaaacct tgtgtgattg gcaacaccaa gatttgtccc acatccagat 169768497
agagactagg ggctagaata cctctcccct gcccgtttct ccgggcttga 169768547
catttcagcc agacacctct tccacttcct caaaacttat ctgtctcctc 169768597
ttttacttcc tcagttcctt gtttgtctaa aacaccagct aactgataat 169768647
tgcatttata gttactatgt tttcctccta gataacaagc ttcattgaag 169768697
attttctaaa aatatttggc tctaatataa gggaaattgg gatcaccatg 169768747
agcagtgagt tggtgggaga gagattgggg gtacgtttat ggaaaatcac 169768797
ggatccgtgg gtctggaagt taaaagagga ctggcccttt gagcaaataa 169768847
atgaagagta agctggagag cttgtgtgta tagcatttga gggcaagggc 169768897
tctggagttc aacacactca gcctcaaatc acctacccat tattggtcgt 169768947
gtaaatgtgg ccaagttact tgactgctct gtgccttggt ttttccatct 169768997
ctaaaatgga cataataacc catacagggt tattataagg attttgacaa 169769047
gaaatggcag gtagcaataa ttacacctac tgaatttaaa aagtggctca 169769097
ggcacaagag gtgagtggcc tgttcaaggc agcatggcct ggaagacctt 169769147
cagcaggggc cagtaagctt actagccctc atacccagga aagcggttta 169769197
tttctcctcc cacatcagca tccctctctt cttcctatgt cggccccaga 169769247
aggttcacac cctctccctc ttaggctcct tcctcattcc gaggcctgga 169769297
gggtctttgc acagagagga atctgcttcc tgcctagagc ttggagaacc 169769347
ccaggccttc cgcattcatg aggtccaagg ccaggcagga ggcaaggcca 169769397
tgggcccaaa tctgtgccat gagtgtcaac agaagatccc aaagctggag 169769447
accccaaata aaaaccccaa gagatgtggg ggcatcagct tcctcagact 169769497
caacccagca ccattcagca gctttcaaga ccaagaagtc catactgttc 169769547
tcttgctcgc aagatactca gcctatgaaa tcctcagcta atggagtcct 169769597
cagagcagca tggagccttg gggtgatttt tgaggaactg acactgggaa 169769647
acagcctagg gtctgtggtg cgcatggtgg gcagcagccc ttgcctgtcc 169769697
acaccacgga ccagctaacc atagacgagt taagagtgac agcatgctac 169769747
tgctagcggg ggaagctgca cgtgccatgg ttaaggaccc cagggctggg 169769797
tctgtgcccc atcatgttgc gtaacaagaa agacaaggat tgcaggtgct 169769847
ttcccacaac taaggtgggt gcagctgctg ggaatgggag aaacatttat 169769897
agatctaagg atgggcagga atttagaaag gtaagggtac tgtctgcctt 169769947
ggctgatact tttatttcct tctatccata agtgtaacaa aaaaattttt 169769997
ttaaatgcta tgtaaagata gggaggtttg aaatttttac caacaatccc 169770047
aatccttgaa cacaaagact attatcatat ttgtgactgt tgaatatttt 169770097
ttaaagacat gttaatacta cagggaactg catttctata gaatgcactt 169770147
tggaaagcat tgccctacag tatttataaa tttcagaaca cattttagga 169770197
tctgccttgt gttgtttctg tcatcatttt acatttgcta gtcttgactt 169770247
ccaaccaccc aacacgcttc ctgagggcag ggcaaacttg gacattattg 169770297
acagaacaag tgcccaatct gaaaatgtgt cacattcctg ctcaggttcc 169770347
aaacatgtca tagcggattt atgggtgtaa attatactgt ttgctcaaaa 169770397
cactacctca tcttcagtgg cgtagtgaca gtgaccttca aactatggtg 169770447
gcatcttagc tataggggtg tccctcaaaa agcatgggct ttgttgaagc 169770497
acaacttact ctgctgtgtg acttaagtca aatagcttaa tctctctcag 169770547
cctcaacttt cccacctgta acctgggcag gataatagtt tttagcttct 169770597
agaacagatt aagggtggta atatgagtgg accatttaga gtagctcatg 169770647
agataaaact caaatgctag ctgttgtcat ttggctgtta atgttatctt 169770697

FIG. 1.21

gaaatcccac	agtagtcaat	agtggatggc	attaattgga	ggagggaatt	169770747
gttagataaa	agatggttac	tagatgatag	aaggagattc	aaattattga	169770797
ctggcagaga	actgtttatg	gaagagttct	tggctcgtaa	gagcctcagt	169770847
tagatagagc	agggccattg	gagggagacc	agttgcttga	atgcaagctg	169770897
ttaatcctca	gggaatctcc	atggctcagc	cagatcctgg	tctgtaatct	169770947
gctctcacca	cgggctgact	gaatgagctc	attgtcatgt	aatttaatag	169770997
gagccaggtg	tctgtgattt	ccaagagcgt	gagcagaatc	atcctgcacc	169771047
ccaaactagg	agggggaaaa	acacctcgca	gaagcacact	tgtccctagc	169771097
tgctttccat	gtgtcagaca	gagaggaaat	tgtccaattc	caaatgcatt	169771147
cctatccttc	tcgggcgatg	agagaaagta	attggcatag	tttgagtgaa	169771197
atgaaggtgg	tggtttgggg	tatttggtat	ttcttattgg	cataaaggaa	169771247
aacttgtatt	ttaaataccc	cctggcttct	tgaagaacgc	tttctctgct	169771297
gtcactgcgg	cccttgtcaa	aaaaacctta	gctgaaaaga	aaaaagaatg	169771347
cacagaaaaa	gagcagcaga	gtgaaggctc	agtcaggcgg	tgggtctttt	169771397
tgcgtgggta	tttgaaggaa	gaaggaaggt	gctggaggga	aagtcaggct	169771447
gctctggaaa	catttcagtc	ctggaacacc	tggtctctaa	aggtgccatc	169771497
aatagcacac	actccccagg	cactgcaaag	tgggcaagca	ggtggggttt	169771547
gccagtgagc	aaccctcagg	gctgcagagg	cgggaggggc	agtacgggga	169771597
gaggctctat	tctagggacc	caacaatcag	tgactgttca	tctccagact	169771647
cagcctgatt	actgatgcac	ccgagctcac	acagacctaa	gaggcagatc	169771697
caggatgtga	acactggtct	ggctgatgct	caagactgtg	ccattcctct	169771747
gccctcatgc	catctcctga	agttgaaatc	tcaaacttgg	ctgtgtcacc	169771797
actgtcctcc	ttggctggga	gtgggttcat	aatttacaaa	aatccatcag	169771847
gacactcccc	tgggaccacc	tgccttcagg	gtcttgaggc	ctcaaaaagt	169771897
tgccctcagg	gattagacct	ggggtcacaa	tgtgtgcaat	gtgggtgtga	169771947
actcatgtgt	ccagttgctc	tcagcaagcc	aacaagttca	agtcacttct	169771997
ccatcccacg	gctttgctct	tgtaacttgg	gaacaaacag	taccccatga	169772047
ataagttcac	agaggcaggg	ttgtgcagta	gtgacacgca	caggctcttg	169772097
aggcagtctg	ggttccaatc	caccccctgcc	accaggatcg	ccatgtaggg	169772147
ttgtgtggct	tatggcccgt	tccagagctc	caggccaaga	tgacaagggg	169772197
ggcccagcct	gtgccactct	actaagccat	ggtccctgga	attccaccga	169772247
cagcagggtg	tcttatgcca	gttctacaaa	gtattcacat	gggcgaggcc	169772297
tggccctgtg	tgctgctaag	agctgaggaa	tttggttgag	ttacataccc	169772347
tcagtgtgcc	tcagtgtctt	tccctgtaaa	atgggcaaca	taatgtattt	169772397
ctcctctggg	ttgtcatgag	cattcaaggg	gttaataccc	agaaagaact	169772447
tagatcagtg	cctaaagtct	ggtaaatact	caaaaacaag	tagtaaatat	169772497
ctaagaggct	agctgttagc	atttgactgg	catttttaag	tgtgttttgc	169772547
taaaggccaa	atctgaatcc	atagtgtttt	ccagttttat	atgattttgt	169772597
tctaagatcc	agtgtaacta	tcaggaatcc	tgggcaaagc	catcagagtg	169772647
ctgtgagccc	ctgccagcca	tcccgtctca	tcagcctgcc	ctgtgcaggg	169772697
cctcctgagt	cccccactca	ggggatcaca	gacacagtgc	agggcctcct	169772747
gggtccccca	ctcaggggat	tgcagacata	gcatgggtgc	acctgggtcc	169772797
cccacacagg	ggatcgcaga	cacagtgaag	gtgtaccagg	tcccccactc	169772847
aggagatcgc	agacacagtg	aaggtgtacc	aggtccccca	ctcaggagat	169772897
cgcagacaca	gtgcaggtgc	acctgggtcc	cccatgcagg	gtattgcaga	169772947
cacagcatgg	gtgcaccggg	tcccccacac	aggggatcgc	agacatagtg	169772997
caggggcacc	tgcatgttgt	tcttgcaccc	tgaaatggaa	taggaaggct	169773047
ggcttttttt	tttttctttt	ttagctcatc	ttctgttttg	gaccaattaa	169773097
aataaaggca	ttttaaatag	gccctgtgga	aagggaactg	aagttgtttc	169773147
cccaggctga	gctctgcacc	agaggtcagg	gcaggattaa	taaggaagct	169773197
ataaatacaa	acaatggccc	atgtctctgt	gggcaatgtg	ctctggtttg	169773247
ggaggaaggg	agaaaattaa	attataatgg	gaaaatataa	attatttgga	169773297

FIG. 1.22

tcaggataaa aaggaagaaa tcagtggtgt ctgaatgaat ctcagtgaat 169773347
ctgtcagaag agttgtgagg ttggctcagt gtaggtgcac aaagatgcct 169773397
aggaggatgg tggaacaggg ccccacacag acgcaggtga aactccagag 169773447
tcctgccttt tactgttagc catgccccac ctgtggaatt cagtgctatt 169773497
ctgagatgag agatgattgt atttgtcaga ttttctatca aagtaaatat 169773547
agatggtcac ccacccagtg aatgtgattt tagcaccttc cctgttgcag 169773597
accctcccag gtactggagg tttagaggga aacagagcca gctctatgtt 169773647
gccctcaagg agcacccaga catatcatgt ggccaagatg attgcatcca 169773697
agcgatgcta attgattgca gccttgcatg gacctggcca ggtgctacag 169773747
ctccttggta gcacttgctc acttttattt catggtacct cctctccccg 169773797
ctagggggca aatgtcatta tgatgcccat tttacagata aggaagctga 169773847
ggttcaaaga tatgagggga cttcctcaca gccaatatgt ggcagagtca 169773897
tggttcaaac ccaggggttc gtaccttcaa agaccaagtt ctcatccact 169773947
gtgcagacaa atgttctgac agaggacagg caggggacag agagtgagag 169773997
aaagagagag attgtgtgtg tacatgtgtg cacatgtgta tggcagtggc 169774047
tctgtgtcaa cctggaaggc ttcttggagg tggtgatgtc tagtggaatc 169774097
ctaaaggaaa ggtcttaaat gctacactaa ggaatttgga ttttatcaac 169774147
atttttttc tttttgagc agaattcaga catgattata tccccccaac 169774197
aaatctatat ttaataagca actccaaggt gccagacaat cttctaggtg 169774247
cagagagggt tgcagacact taatataaga tgtagtctct gccctttcct 169774297
agcttcagtc tagctggaga gatgaaacac agatttattt agaagataat 169774347
aagtaacagt gtcaataaac caatgccgag cgccaaataa aagtcagtga 169774397
gtaggtgagt ggaggtcaga agagggggca gtctgggctc tgggttggtc 169774447
aaggaaggct cccagggtag atggagagag agaggttgga ggggttatgg 169774497
aagattccag aaagggtgca ctttgagggc tggggcctag tgtttggcag 169774547
tactagttcc cccatgctta gcagagggcc tgcccatagc aagtgacggt 169774597
gcatgctggc tgaatgaata aatgttggac ccaatgaaaa gaaaggacaa 169774647
acggttgaga gatgaggcat aacaaacgga ctgtgggttg cagggatgtg 169774697
tgaccactga gcctctaccc agcccaccaa tacagtttag ttgacttgtg 169774747
gccccaccag tcagatgacc ttccttggct ttccattttt ttttaggtca 169774797
tgcaggcaca tctgtgggag aagcaagtag actctatagg ggaaaagcag 169774847
gagaaaagat gggagaagcc ttgggtgaca gaaggaggaa gccttgaatg 169774897
tgagtccaac atgttagctt ttttcctgca ggcaggaggc agccattgag 169774947
gcctctggac attcaagtag caagaggtaa atgatttggg gagattgatc 169774997
tggccctcca agggggaaag aggaaaaatg ctataggaga gggtttcagg 169775047
aagtgactcc tgctatttaa aacgtgcaaa ccctttcatc cagaaatgtg 169775097
acttctggag atttgcccca agatcgtgga acaagtgtga agaaacaaaa 169775147
acaaacaaaa accagcaaaa tgcctcctgg aggtccttgc agtgctgtct 169775197
tgggtggaga aaactagaat gcagctttct ccaggggtgc agtgcagagt 169775247
gagggagctt gctttttctc tgctgcctct cacctcaggg cctctgcacc 169775297
agatgttccc tctgcctgaa atgcttttcc ctgccaggtc acatggctca 169775347
atccttatct ttgctgaaat gccccccttct cagcaagacc ttccctgatc 169775397
accctattca aattttcttc tgtagcccca ccccctcatt tacaccacac 169775447
acctgccgcc ccaggcaccc agcctcgtga ctatctgaca tacccttcat 169775497
tttatttgtg tatctcctgt ccctctggaa tggaaactgc agtggcgatt 169775547
gttgtctgtt ttgcacacag gcagtatcct cagtgctaaa gcagcgctgg 169775597
gcgtagtaag tgctcagtga agatctgttg aatgagtgaa tgaaggaagg 169775647
gaggaaggaa tgatggtggg taaatcggcg agtgtgtggc ctacacagga 169775697
cattagcttg agcaccagag agcagaccaa ggcaggtcct tggttcctgt 169775747
gccgacctgc attgcggagg actgcggggt cttggtagat gaagcctggc 169775797
ctgggtcttt cagggccctc tggctggggc caggaggcac agctgcagtg 169775847
gacactttca aactcatcgt gcctggcctt ggcactcggt gggctcattt 169775897

FIG. 1.23

ctggtcataa tgacaccttt ctaaacatag ctacacaaaa ttaaaatgtc 169775947
acagtgcaaa tgctgcagct gtgtggtact agaaagaaca ctaggtcttg 169775997
agtcagaaga gatggactca aatcccaaat atcaagccat ctctctcctg 169776047
ggtgtgacct tgcacttctc tgagcttcag tttcttcatc tgcaagatgg 169776097
gaatggtacc agtagctgtg tcacagactg ttgtgaaggc cgaggaatta 169776147
agcacggcga gagattttg gaagctgcaa agcatcacac attggacatg 169776197
acttttacac ataaatatgt aaaaatggtc tcctgactgc gtccttggct 169776247
tcctggcctg ccacatggaa tgagggcagg gcctccctct cagcacagac 169776297
tggtctcctc caccagccca gcctcccctt gtcacagtga gaaggagcca 169776347
ttgacccact cagaagccac tcacttctct cttacatggg gaaatcagca 169776397
aaccacaacc atttatgaat cctgcatgtt cccctggtct tgtccaactg 169776447
tatctgctac cattcctgag tggaagttaa aaaaaaaaaa aaaaaaaggc 169776497
agagcaagtt gaagatggga aagaggtgac ctaaggtgac aaagagtcaa 169776547
tgtagaaggc agatatgtct catcctcgca gtgactaaga ttaatgggca 169776597
tggagtgtca ggagccctgc cttaggaaga actctgagac tggctccaga 169776647
attctgtaaa tccaatcaag agtgttgcaa tcagttagca atgtctgcct 169776697
caggcaaggg agaagaaact atggtctgta tgtcatatct aatattctcc 169776747
cttatatcta aggtaccctc tgctgtgaga catgcaatca acccgatgaa 169776797
gctttttagg aaaaagtcta ttgttacatc aagtttaacg taaagctgcc 169776847
tccttacata ttttaaggtc agcctaaagg tttctctgca catcgtgaac 169776897
tatagcaagt agagatgtaa acagactgta gcctacactt gtgccgatca 169776947
atgagtttg gccaatcaaa tgtggccaac tgtttgaacc atgttcaaac 169776997
agggcaaatg ctgagctata accaacccag ctgtttctgt ccctcacttc 169777047
tgttctctgt gcatcacttt cctttttctg tccataaatc tttttccacc 169777097
acgtggctgc gctggagtct ctgagtctac tctggctcag gaggctgccc 169777147
aattcaaaat cattcattgc tcaattaaac tctttcaaat ttaattctgc 169777197
tgaagttttt cttttatcac tctattaatg ctagatgttg actattgaat 169777247
ggatccaagt ttcaggaact tacaaaatgt gtgtgtgttt gaaagaagga 169777297
aatcattact tgctatccct tctctatcaa aatctacttg agcttttcaa 169777347
ctaaaaattc aatgcgtatt ctttggggta taaataaatg tgctgaatct 169777397
acctgggctt ttcccactct gtggcttctt gtttctatgt gtgatgcgaa 169777447
aaggaagctg tggaaatggg gaggagattc ttccaggtgt tgggaaggct 169777497
tccaatgccc agcatgtagt aggtgctcag caaatgtttg ttgaatgaat 169777547
tttcaatgat gacctcagtt tctgcataac ttttcatgat tcataaatgc 169777597
tgttacctta gctaagttta aatgtagtat tttatctcct gtcatatata 169777647
tttttctctc tttttctgtg agtagacgcc atgataatca atcgggataa 169777697
cccacgagga cgttgtttca ttctttctga gtgaggggat ggggctgata 169777747
gaggaagccg gggaggggtt tgcctgctga tttcttcctg cttttgtgtt 169777797
tgtgtttgcc gtctgcctgt ccctcacatt tccctcagtg tgttcctatc 169777847
cttggatccc taatcctaca gcccaggact ttctacaacg gtactactga 169777897
cattttggat gggataattc tttgctgtgg ggggactctc ctgtgtgctg 169777947
tgacatttag caatatccct ggcctctacc tactggatac cagaggcacc 169777997
ccccaccccc agccgtgaca actaaaaatg tctcaagaca caccacccag 169778047
gtgagaacca ctgcttagcc tccccgggga acatggctgg ttccttcttt 169778097
ctgaacagtt tcagaaggaa catcaagtct gcaacaagtc ttctgacttc 169778147
atggtccaca ccagtgtcag gcccaccgtc ctatcaaccc tccaggctca 169778197
tgtctccaag gagctctctg atcattccct ggtgtctctc tcgtttgctg 169778247
tctgcccctc tcccctgggc tatgagcgcc acaggagttt tttctatttt 169778297
gattatctct ctatccctgg ggcccagaag tccctggcac tcaataggtt 169778347
ctccagtgga taaaggtgag gacgaggtga ctgggggagc ctccctgtgg 169778397
agtgacgtct ccatgccatg aaattgccag ccctgggaag tcatgaggaa 169778447
gaacactcca ggcagagggc acagtcaccg cacagctctc aggcaggaac 169778497

FIG. 1.24

aggtttgcct tgtggaaggc tgctggggag gagaggggag cgggattgga 169778547
gaagggtgct ccaagagcca gaaaagctag tcaggaggcc acagtgaggg 169778597
gtgcaaactc agttccagga gtgacaacaa gccctctgga aacctcccag 169778647
atgtcccaag gtccacccct ggcccactct cactctcctc tctccttgtc 169778697
gcccagcctc actctgggaa ggctggggag gattcctaaa tctggtctga 169778747
actcctgagg ctgaagccag agctggtgtg gcccccaagt catatctcag 169778797
ggtgggagag agtccttcca tcaaggaggc aacgctatga gggcagctca 169778847
gtgctcagcc cacccctcta accctcatgg gcgggccctc aatcagaaac 169778897
cacaaattcc aggctcagtc agggaaggcc tggatcctcc acttccggct 169778947
cctcccggaa gtcagcttaa agaaatgatg cggaggaatg atcactgaag 169778997
agactcgtca ttcctggtca aaccatgctg gaggtcaggg gtttgttaac 169779047
tcagccttgt cacaggggcc ttcccttcca cctcaatgct acgacagagc 169779097
tggtgttgaa ggtctttgac gaaaaagcta catttctgca tttaaaatgg 169779147
agaagatcag gccactcagt atctccggtg taagaagaca tttggcaata 169779197
gtaacagcta atttttttta atacttaccg taactcattt tacccatttc 169779247
ctgcctagaa aaaaaaaaag tgcagctcac tgccagcact catttcttgg 169779297
ggcaaacagg aaataagtta atcttaacaa caaccctgta aggtgcatag 169779347
ttttattatc atccccattt tacagatggg gaaactgagg cagtgaagtt 169779397
tagtaatttt cccagattca ctaaaatttc taagatatgt ttaacaaaga 169779447
aatccaccct ttaactctta aataatatcc tctttttaaa attaatgcta 169779497
gaatatggtg caatatcttt ttaattgagt gtatcttttg ccccagcaat 169779547
tctaccacta ggaactgagc ctaaggaggt ataaatattt agttagaagg 169779597
atgcagtatt atttagtatg tggaactcaa tgagaatctc cactaagagg 169779647
ggttatttaa ataaactgtg atgcctccat ataaatgtag ctgttcaaaa 169779697
tgacatctgt ttgtatgtac caacataaaa agacatctaa atcatatatt 169779747
ttaacagaaa agtccagaat aatcacattt ttgtaagcag tcattttgtc 169779797
tgaggactgg gatttctatt gacttttaat ttcttatttt cacgtgtcta 169779847
tagtctctaa tttttctaca atgaacatgt actacattta taataagaaa 169779897
gaaactcaat aaaagttatt gagtaaaaga ataagcagcc agaaatctgt 169779947
ctcttctggg gaattagtga gcctcttcct ccctgagagt agacgctatg 169779997
gctgctttgc tggaaccttc catttgtccc aaatgctcca ctctctgcca 169780047
atgggagacg gggtctatat tcacctggtc ccttctgcgt gaggccacct 169780097
tggcagaagt cactgcccct cccaaggcat ctgaccctgc aaaaccctct 169780147
tgtcgtctgg gttctggtaa actccccatt ccctgttttt tttgtgggta 169780197
tacagatagt aaaagctctg ctgccctggc cctggtttta aatgccccct 169780247
ggtgttttct ctatacgcca ctgacacctt gatcatgagt caaatcacct 169780297
gaacatagag tagcatctgc ttcctgttga gaatccaacg aatacattta 169780347
cctgatttgc tctctcttct tttcctaagt cctaacttcc taaaataaaa 169780397
tgactctcca attcacctgt ccaccttggc cttctctcct tatacccagt 169780447
cttgcccact agacgtcttc gtttgggcaa ccacacagct tataagcctc 169780497
ctgatgccca ccacaggagt cttattttgt gctgccacgt taaattctct 169780547
cttccatgag caccactctt tcactttcca cccactccaa acctgaaaat 169780597
cacctttctc cacccctcct ttaatttttt acatctcatc agtgcccaaa 169780647
acttctgaaa tcaacctcag taatgtttcc ttcaaataac cccttcccgg 169780697
ctgggcgcag tggctcatgc ctgtaatccc agcatttggg gaggccaagg 169780747
tgggtggatc acttgaggtc aggagttcaa gaccagcctg accaacatgg 169780797
agaaacccca tctctactaa aaatacaaaa tttagctggg cagggtggca 169780847
tgcacctgta atcccagcta ctggggaggc tgaggcagga aaattgcttg 169780897
aacccaggag gtggaggttg cagagctgag actgcaccac tgcgctccag 169780947
cctgggctac aaagtgagac tctgtctcaa aaaaacaaaa caaataccct 169780997
cttcccatca tttctccagc ccttgcctcc tcaagtcctc ctgactgggt 169781047
tcccttggct ccctgcttcc ccctcagtct gttatgtgtg acttctgggt 169781097

FIG. 1.25

```
aaaggttctt aaaatacaat tcagatccta tccagtcccc tactcaaaac  169781147
tgtgcccatg ggatcaaaac caaactctgc aacattccat tcagagcttt  169781197
aagagtactt ttcagcctga ggtctcctcc tcaccactaa caccccttccc 169781247
tccaatcaaa ctgatccatt gtacctacaa aaagcccgtc ccacctccta  169781297
gcctttgttc acactgggtt ctctgctgga tcaccatccc tccacatttc  169781347
caggtgtccc tcaagactac tcagcagcag ctatccatac aagttcctca  169781397
accctggctt tcttgccctc aagtaaccag ttcatcctcc ccagtcatat  169781447
agccctctat ttacatttct tttctggaag ctatcatttt tcacgtgcca  169781497
tttgagtgag tgtcctcgct aagacgatat tttctttgag ggcagtaacc  169781547
tttcttatat gtctctgtat cccatgaact tagcaaaaaa caagggacag  169781597
aacaggtgca aagtctacgt ggttagtgaa tttaacagat cttcctaacg  169781647
tgtaaacgtc gttgtccagg tgaatggaag aagtgagctg agatagaggg  169781697
gacagacaga gtcagtgtcc agtgctgacc tctgaaatgg aaaaacatgg  169781747
ccagtcctta ggaggctgca gaggccaaga ccccagtgag gtttgggggt  169781797
tccacagcag aggaggagct gtggaccaca gcaggacccc gatgccatca  169781847
gcaggggagg aagtaatcag agaggtggag gaaggaagcc aagggaagtc  169781897
aagtaaacac caaatattcc ctcccggtcc aatgctgtga cctgcataag  169781947
ccaccactcc cccagtctag actctaccca tggaagaagg aagaagatag  169781997
aactctggat ttgaatataa ttctaaaata accaaattta tctgaaaatg  169782047
actaggctga gttttctgct tcaaccagaa atggagcttg gagtcagaaa  169782097
ttatgtgaaa ttatagaaga gaaagtcacc atcttccatc tctgagtcgt  169782147
atgatcattt tagacataaa attgtgcact tacgatgtac caagtgctta  169782197
atatacgtga tctcatttca ccagggaaac tgtataattc attgctttaa  169782247
ctgacaaaat tctgcaactg aagaaggtgc tgttaataat tgcattggga  169782297
cgcaggcctg agcaggccat gatttgtggc tgtcctacat ctgaccctca  169782347
cagtatccat gggagaaggc agcatgttta tgccccctga cagctgggga  169782397
aaccaacact taaagtgatt aagtcacaag tccaaaataa atgacagagc  169782447
tgcagttcaa gcccaggtgg tcatttacca aaggccatgc tcttttcact  169782497
ttgcatggga ctgtgaccgc tggctctacc cagcttccca gtgcgaccct  169782547
tccccgccca ctgtttctct tctctggcca acggaaacac aatgagacca  169782597
catatgtaac attacatttt ttcatagcca cattgaaaag aaaaaggaac  169782647
caggtaaaat ccattttaat atgatatttt atttaaccca atacagttga  169782697
ggcttgaaca acacaggttt gaactgtgtg ggtccgctta cacatggctt  169782747
ttgttcagtc tctgccaccc ctgagacagc agggccagcc cctcctcttc  169782797
cgcctcctcc tcagcccact ctacatgaaa acaaagagga tgatgatctt  169782847
tttgatgatc cactttcact taataaatag caaatatatg ttctcttctt  169782897
tatgatttct cgtaataaca ttttcttttc tctagcctca tttactgtaa  169782947
gaatacagca tattcccagc tactcaggaa gctgaggcag gagaatcact  169782997
tgaacctggg aggccgagtt tgcagtgagc caaaatcgca ccattgcact  169783047
ccagcctggg caacaagagc gaaactccaa ctcaaaaaaa aaaaaaataa  169783097
aaagaataca gcgtataatg catgtaacat ataaaatatg tgttaatcaa  169783147
ctgtctatgt tatgggtaag tcttccagtc aacagcaggc tattaggagt  169783197
taagtttctg ggaatcaaa ggttatacac aggatttga cggcatggtg    169783247
gttggcactc ctaactccca catcgttcag ggtcaactgt atattcaaaa  169783297
tagtattcaa aatgtaatca ataggaaata gtcattcatg aaatactgcg  169783347
tcttcttctt ctcccccca accccacttc tttgtattca gtcttcgaag   169783397
tcagtgggta ttttaacctt acagcatatc tcaattcaga ttactcacac  169783447
tctaaggact caatagccac gtatggctgg ggtctgccag ccggacagcg  169783497
aggtctagcc ctgatctgag caggagccat ttgattgggt tgttggtaca  169783547
ctgccatctg gtggacagat gttccttgct tgaaaaacca cctcgaagga  169783597
aagtatcagc atcagggaca atagcacagt gggcctcagg atcagctccc  169783647
cggaaagagc ttggggttgg agggggtgtt gttgctgagg atgtccccag  169783697
```

FIG. 1.26

agaagatgta cagccatgga gcaaactcaa gtcacttatg atgtcggcaa 169783747
accttggccg tggtgcactc ttgtttcctg gttgcaaaag gatttagcag 169783797
aaaatggtaa ctctttttca gaaggcatat ttaaagcagc tctttaaaaa 169783847
gcaggagttt ctttcacacc cagtttcgcc atgtggttgt gtgaagggct 169783897
tctccccaga aatcatgtgg tctctctttt aattcacagt aaaaaccttt 169783947
cttctgtctt ggcccattat ggctgctata acaaaatatc ataagctggc 169783997
cttatatacc atagaaatgt atttctcaca tttctgaagg ctgggaaatc 169784047
catgattaag agttggtgtc tggtgggagc ctgctttctg gttcactgat 169784097
ggcgtcttct tgctgtgtct tcaccgaggg gtagggacaa ggcagctctc 169784147
tgcagcctct tttctaaggg cactagacct atttgccatg gttccagcct 169784197
catgaactaa tcatttccca aagtccccac ctcccaacac catcatcttc 169784247
atgattagat ttcaatatat gaatttggga gaggatagaa acattgagac 169784297
catagcatct gccaagttgt gtcttcctca ctcaaattgg gtaggtgtgg 169784347
ttattccaga gtttcagtga accaagacgt atttttccaa tgtgaataat 169784397
taattaagaa cacttgatta gggtcaatgt tattctggac ttctgaatca 169784447
ctcccacatt tgaaggggag ttttaaacac aactttgtgt gaataaaatg 169784497
atgtgtctgc atctctccag gaagcagtgt ttggagctga gatgacttgg 169784547
cagggagaag aatccactgg gacattcaat aacttggcat tgagagtgtt 169784597
ttcagcacca tgctgtcctc agaatagtgt tagaatttat ataaacacag 169784647
atgtgacttg tgccttgaag gagaatacag tcttcccagg agagacatgc 169784697
aaaaccatca tagacaaaca gcaagaaaac agcatcaagg atgtacatgc 169784747
accgggcaga atgtaaactg gatgtaaaac caagcatttg agggcaatga 169784797
gaaaggaact tggttctggt ctcaactctg ccacccacag ctgcgtgact 169784847
atgtctctgt cacactgctt ctcaggtctt caactttatc gtctcatact 169784897
gagcaagaga cagtctggac aatttatgct tctagaatgg ggagacaaga 169784947
agaaaagaaa gatagatacc caaggacttc agtgactggc tcaggaagaa 169784997
ttactcagca gtgagggggc cagcatgagc ccaggggcaa gaagccggga 169785047
cttggaacag gaaggaaagg tgctcagctg gctaacctag aggaaagtga 169785097
ttggctggag tgtctggttt atctgtttca gggatggtta aagattgccc 169785147
cgttaatagg caaaaattgt tgccttaaag aacctagaat ctaaaggggt 169785197
ctttgacata atacagaata acaggtccca gagattattt tacagaatgt 169785247
tagtacctca tgatattaat agatatataa caaaacagac ttctttgcca 169785297
caagacttct cagtaccttt aacattttat gattttccca aaggacaaag 169785347
agtatgcagc atttcccaga cttaaattta actgtgaaca cctgttatcc 169785397
tggggcaggc ggattgcttg agtccaggac ttagagtcta gcctgggcaa 169785447
catgacgaaa ccctacctct accaaaaatc caaaactcag ctgagcatgg 169785497
tggcatgtgc ctgtagtccc agctgctcag gaggttgagg tgggaggact 169785547
gcttgagccc aggaggtgga agctgcagtg agctatgttc acaccactcc 169785597
actccagcct ggacgacaga gcacaaccct gtctcaaaca aacgaacttc 169785647
agtgactggc tcttaaaaac aaacaaaaac ctcacagaac cctcactgct 169785697
ctagtcctga ctttttatag atagggaaac tgaaaagcta agaggcaagt 169785747
ccaaatttca caaagatagt ggcagagcca agattggatt tttggtcttt 169785797
tgactctaat acccagtgaa tttctttttc tttcttgttt tttttttttc 169785847
aattcctatt atacactatt taagacacac aaacagataa aaagactaat 169785897
acaagatatc catgcaccac cacctagtgt aagaaataaa acatcaccaa 169785947
cacaataaaa ccccccttgtg tacctctctc catttgtctc cccaagggaa 169785997
cccatatcct gaatttggag atataataca tgaaaattct ggtggaattt 169786047
caaataagtc atattgtctt tagaggatct tcttagcatc tcccatgatg 169786097
tctaagttgt ttcaaaacaa aaccaaaaac cccacttggc ccagaagagc 169786147
aaagattaaa agccagcctc gaggatcccc agcttggcta cctgcagctc 169786197
acagcatatt ggaaaaattt tatgaatcgg tgaacttttt cattctcaaa 169786247
tgggctcttc agatggttta ttaattctgt tagatgcggg ggtgcgtctg 169786297

FIG. 1.27

gctttattct gtgtggaatt tttggatgaa ttcactgcct caccccctcc 169786347
cctccacagg ccagatgggg agccgggtgc tgtataaatg tttaattgtg 169786397
gctcagtaaa aatatttgct ttcagtagct ggaagctacc aaacggaggt 169786447
agcgctgtct actagagttg ccagacttca ttctaatgag aacagaaata 169786497
aaggctgatt aaatcaaatt ccccatagtg tagaaccact taaataaatg 169786547
tttcatattg tttgcatgat gattttaaaa tgtaacagct gcttatgtaa 169786597
ccattaggct ggacataaat cattcatcgc catcactgcc gtcaaagcag 169786647
cactggctct ttttcttctg ctgctgacat ttccattact agggagcttc 169786697
tcagacatgc tcttgggttc cctgtcctta cccaagtgcg gggtagcagg 169786747
agactgaggg agggatgagg aatgaagagc aggcacgaag ctgccattta 169786797
tcgaaggcct actttgcaca tgtcccattg ggctggcatt gtcacatttc 169786847
atccttccca caaggaggca ttactgttcc cattttatag atagggatgc 169786897
tgaggcctat ggaaatgaag tgagctgccc ccagagtagg gaatacagcc 169786947
tgtatgtgaa ctcaggtgtg tctgagcctt ggcaactcac acaaggctgc 169786997
ccgagaacaa agggtgcatc ccaccccgag gctccacaca cctcaggcct 169787047
tttagcaatg atgagagcag tgaagaccag accaagactc agaaaactgc 169787097
agaatccttt cggctggggc taggggtggg gcagggtaga tactgatcca 169787147
aaggatttgg actccttttc ctagtccaaa tccccatcgt ctctcccctg 169787197
ttcactgtgt cagcctcctg actcccctgc ctccattctt gcccatctca 169787247
atccatcatt cacccagtag cctgagcgat cttttaaaag tagaagtcag 169787297
attatgtcat tctcctgctc aaaagcctcc aatggcatcc caccactctt 169787347
agaataaagc ccaacctccc accatggccc tcaaggcctt ttatgatatg 169787397
gcccctgcca acatttgctc attcgttcct accccactcc tttatctggg 169787447
cgtcttggct tctttctggt cttcagacac aataagctca tgcctaccta 169787497
agggcctttg cacatgctgg aaccatcctc ctcagaccct tcccatgact 169787547
agcttcaacc tgtcattcag acctcagctc caagtcactt cctcagaaag 169787597
gccctccctg taccctggat tgaaaacagc cctcccctgc acacgctcca 169787647
caccatagct ctgtttcatt tactttacag cactgaacac tgtctctatt 169787697
tcttatttgc tattttccta tcccactata atgtaagctc catgacagat 169787747
atctgggcgg ttctccactg cttccccagc cctagaatgc tgactgtaat 169787797
gtagtaagtg ttcaataact attacttaaa taaatgaatt aacttgtctc 169787847
attcttttcc cctgcatcca agttgggtga accctgacct ggccccttga 169787897
aagagacaat ttgattctga aaaccaattc ttacctccag gctcaggccc 169787947
catgcaggag tctttctcca ggtggcctgg ccatgcaggt gatggcagtc 169787997
atgggggag gcagagagct gctggagaaa agctaggagg ccctttgggg 169788047
ttccctgtat tcataggaag gaggatccct tggatccatg cccccaactc 169788097
tgcaaagctg agtctaaagg atacacagaa cacaagacat ccttctgttg 169788147
ccaccaaagc ttctgacacc ccattttggc tggagagaga cttgggcaca 169788197
gttcttgaat tggctgcaac tccaccctcc ctcctgcaag tgcctcttcc 169788247
tctgccacgg aagcctctgt gccatgaaga agaccaccag acctctccag 169788297
gtgagggctc tgggtgtcag tcccctacgc cctagcaaga tctggaaggc 169788347
aggagccacc ttcctgcagg caggcaaggt cctggaaata taaggttgtc 169788397
tgtggccatt gaccatccta ctgcttcctg gtgacagaaa atgttgcatt 169788447
ggtggcagcc atggggacag cttcctggtt cctgaattgc agcactggtc 169788497
cgtggcatgc tctaggactc aggcatttcc tcagcagctt ttgaggtagt 169788547
ggccccgggc aggtcagttt ggcagtgtgc tggggattat tcctggaggc 169788597
ccagcctggt ggccgcttct ccagcccttc cagtgatttg gaagcggctg 169788647
gttccttgca gtaagtccct tcttcctcga accactgact gatgcagagc 169788697
tcctccatgg tagggactgg ttctcttagg cccctgtatc ctcaggccca 169788747
gcatgcttgg gaaaatgttt gctaatgctt tgtgactcaa aaggaatcac 169788797
acacacacac acacacacac acaaacacac acacacagtt tttaatatta 169788847
tcagtcatat cagccccctg aggcagctgc tctgttccag acaaaccctg 169788897

FIG. 1.28

ttaataacat tcttatcctc tttgtttcat tttccagctc aatttggaag 169788947
cctgaccttg tcttgctttg cctcctactg agagttaata ctgggacata 169788997
ctgaagggcg aaggcttgag tcacaaagtc acagggataa atcctagatc 169789047
cagcagttac tgtctacatg acactaagca gattagttgc cactgggact 169789097
cagttttacc agtctgcaaa atggagctat cagccgcatc tagcactagg 169789147
ggcgctgtga gcatggaggg cagtctgcac acagaggctt aacacagtgc 169789197
ctgagcttgc aggtgcttgg taaatggcaa ttgctgtcag cattgtctga 169789247
tttacctgaa ggaacagttc acactccacc cagattttca ctgcagcagc 169789297
caagaaagaa cttctgggaa agcatctgct tccacccaac tcccaagagg 169789347
ggttcgtaga gggtggagct gagagcccgc ctcccctacc agcctgcaga 169789397
aagaaagcca tgttttggcc tcagggagga gaaacccaga taaaaaccac 169789447
cccatgtgca gcctttgcgt ggccacagga ccagctccac agggagaggg 169789497
aagaggcgcg gccgcaggac cagctccaca gggagaggga agaggcctcc 169789547
tttcaggggt ggggagctga gggcaagaca gaccttttct gactcagccc 169789597
aaggagggct ggagcagggg ctgcaggttc cctgctttct gctacaacac 169789647
agggtagggg agagtcatgg cctcccagag cctctgcagg ttcacctgcc 169789697
aaatggaaat aatagcatcc tcctctgcaa gtcacagcct taaagaggtg 169789747
ctgagagtca ctagttagac ccaagccagc tgtttctggt gcattaggac 169789797
tatcgaccag aacccctgca ttcccagccc ctcctgcggc ctccaacgac 169789847
caggagagaa aggcgtaagg tgtaagactc tgggccaggt tctggcagct 169789897
tatggccact cttttcttgt gtctggacag gagcattata gctacaacca 169789947
tctcatctaa tcctcactgc tgccctatga ggcgggcatt cttatttccc 169789997
cagttttgag ataggcacag aaaggggaag cgacttccca ggttcacatt 169790047
gccagtaagt ggtaggacta ggccctgaaa agcacagcct gccatgggga 169790097
agagaattca tccccagctg agaaccactg tatcctcacc caggggttcc 169790147
cagccaatgc aaacagggac gtgaccagtc tccactggtc ccctgtacca 169790197
ggtctccacc ttgccggcct gctgctgggc cccaggactg ctcccaggct 169790247
gcacctgtgg ggtctgccac ctcctccact tccttttgag aagctgctcc 169790297
caccccttcg ccttcatctc aaaggaaagt gtgctgccag gcagctggag 169790347
ccagatggcc cagagacaac tcttcccatc acacttcctg cagcatctga 169790397
gtccaacccc caactccaga gctggcaagc tgcccagagc ctcccagagg 169790447
aggcctatgg gttaacttca catttagtat tttcagcata tggtagaaag 169790497
aaaatagtgt tgttagatgt acaagtgtga tttccccttt ccagaatgcc 169790547
ttcctctctc ctccacgtgg tgagctccta ttcatacttc aaaaccatgc 169790597
tcaactattc cctgcccacc tgtttccttc cactcctccc cttctaatgt 169790647
gggtgtgtcc cagggacaac atctgtgttc ctcagtgaag ttgagagaag 169790697
cctaaatttg ctctacataa gaaaaaagaa taaggaggta aactggaaac 169790747
gggaggaggc tgggaaacgc agggttggtg gaaggacttg tggggatgtc 169790797
gtggcagcca cctgagggta aggaacgtga cagccagagc agctatgctt 169790847
aaggggcttt gccacagtgc gaaagatagg atacaaggtc ctcttcagtc 169790897
tctccatgaa aaccacagtc aaagtacaca ttactcaccc atgctttgga 169790947
gctagatttg ggcttaatgc tgtctttttt tttttttatt aaaacaatat 169790997
tccaggctga tggaatttaa caacaaggaa cataatatct gacacaaaca 169791047
tagcctaagc cttgatattt atcatcttat atagcaagag atcagggtgt 169791097
tgagaacttt agagcagctc cgttatgtcc aggctctggg cggtttctgg 169791147
gattctgtct gctgtcccat cagtactcac ggggtggctg tgtctgctac 169791197
agacatcata gcctcacgaa accacctaca ctaaagccaa taggaagaaa 169791247
ggtgtgtgtc accttcacct tcccaccctt tatgggggag gaaaatattt 169791297
gccaagtgac ccacctttcc cttctcaatg cccctttgat caaagcctgg 169791347
ttctatgtcc ctgcccagct gcgggtggtg ctaggaaaga aggtatctgg 169791397
ggtttgacag tctgctgtga gggctaaata aaaagggcgt gagaggtctg 169791447
ccctctgctt gtactcctct gctgagggag aacttgctgc ttctggatac 169791497

FIG. 1:29

cacccttttcc catcgtatga tagcctgaag tgttcagaac ttttcccatt 169791547
aaatcacttg aacccgggag gcagaggttg cggtgagccg agatcgcgcc 169791597
actgcactgc agcctgggca acagactgag actctgtctc aaaaaacaac 169791647
aaacaaaatt gactttctcc cactgagccc aaggtgcttt cctggtaact 169791697
tctctttgac ccagtcctgc ctcctgcatc ttccttcagc aaccctgttc 169791747
tccacatcag ccaccagagg gaacatctta aaacacaggg ctagactggg 169791797
catgccgttg tctctgctaa acccctcact gagtccccag tgtctacagg 169791847
ataaaatcca agcttcacgg cattggaggc tcaccacagt cctacttcag 169791897
cctagtctct cttccttatt cttcccctac atatatatgt atatatatat 169791947
atattctcat actgtaggtg aagcaactga aatgcttttt attcccctga 169791997
cactttttgt ttttcaaatt cttgttgtac aaatttatgg gggacatctg 169792047
cagttttgtc acatgcatag attttgtagt agtgaagtca gggcttttag 169792097
ggtatccgtc cccacaatga cgtatattgt acccatcaac taatttctca 169792147
tcatccactc ctccccccaca ccctcaccct tccaagcctc cattgtctat 169792197
tatcccactc tctacatcca tgtatacagg ttatttatct cccatttatg 169792247
ggtgggaaca tgtgatattt gactttcttc acctggcttg tttcacttaa 169792297
gataatgaat tccagtttca ttccagttgc tgcaaaagac gcctcacaga 169792347
attttaaatg cttatatata tacatacacc ccctttgtat ttgcctacac 169792397
aaaactaaca aacctttgtg aaatgtaacc tacaggaaat atgatcatgt 169792447
ctaatgctgg acatgaagca gatgcaatac acaaatccat gaggtagacc 169792497
caggtatttc agatcctgac cttgatctca ggtttactta ttagaccaca 169792547
gaccaaagac tcccactgat gtccccacag atttcaccac ttattcctct 169792597
tgtcccacac actctactcc aaagtcaccc tcctctagag gatagtcacc 169792647
tgagatactt cagcgaccct gctcaccttg gaaaatcagg tgacaggaat 169792697
catcagttaa gcctgtggac agtaagcatc tgttggtctg gatggtgtgg 169792747
tgggcggaag gtaggaccca ataggggctt ttcatggttc cagccccaaa 169792797
cctctgacca tgccagtgca tgctgaaggc ccccattcca tttatggtcg 169792847
gggccacatg atttacattt actgtctcag gttcttcttg taacactgtc 169792897
ttctccaatt tttgataagc caatgcccct gacacttcta tgttttgttc 169792947
aaattgttct acttgcccag cattctcttc caccttctcc agctgtcaaa 169792997
ctcctacaca cccttcaaag cccagctcat gggtcctctc cctgacaatg 169793047
attccagctg aaggagatga cattgctact tccttggctc ctatcatacc 169793097
cggtatggct agtgtagcac ttaacattgc ttggtgcttg gtgacattcc 169793147
caaacgttca tctgtcctca aggatgggaa cgtcctcatt tcccatcatt 169793197
taggaagtgc ttgctaaacc aaagactcag cccctcatca ggaaccagtg 169793247
aaggacagag ctgggaaaga gttgtcatgg gcatggggac tatgtgaggt 169793297
catacgcagt tcctgggtca cagaggtgac ccacgaatgg tagctgcagc 169793347
gttgattgtt gcccctacta ttactgtgtt attactgatc tcagcccttc 169793397
tcttaagtga ccccttcact agtctcatag atgagcggcc agcctgcctc 169793447
ctggatccca gaatttgctc actgtccacg acttcctgtc atggctggga 169793497
acattcaggc aggatctggt cccactcgta ggaggggaag acaaagagtg 169793547
ccatccctcc aggccctccc ctcctgcagg acagatcatc ctgcctcact 169793597
ccatctgcag atgctggcaa agcacattcc agccctcgcc tctgaggcag 169793647
agaaacagat tccaattaag ggacttgcgg aaagtggctt catttttacaa 169793697
gcaattgggt tgtgaattga agcgggcatt aaagtttaca agctaggctg 169793747
gcggaggagc cagaaggcct tgctgccact gcctgtcagg agacatcttc 169793797
tccagttact caacaattgt gtggagtgag tgaggagtcg gcacgaatcc 169793847
tgccctccat ggctgatggt ggaagaaatg tccattcatt cgtcttctta 169793897
aaaccaagga tcaggctgct ggagggcaca ggatcatctc tctcctgata 169793947
ggctttcccc ttctctagcc ttatgtgaga atctggggga ttttaggtgg 169793997
tggtgagaaa atggggaaag aaatcacatt cgttgacctc tgcttacagc 169794047
tgggatcccc acgcagctga gaaatttcca ggaaattacc tgggttcaat 169794097

FIG. 1.30

```
ggaggaactt aacacttcaa gctgtcacct ggtgggaaag ggtggtggca   169794147
agaagtaaca agatctccca aatggatcca accagagaga aggcctcctc   169794197
atttccttct cagccaagcc cacgggggcc ctggaagaca gaggttgccg   169794247
gggcatccag ggtctacacg ggctgagctc cccagacctg gtgcaagggg   169794297
gccaggcatt cccgccaagg ctctgccacc tacccagcag gacccatgag   169794347
ctcagcacct ttctggactt gaggagatgg gtctggtttt ggccttttcc   169794397
ctccagactt ccttctgtct ctgcctctcc actgacacct gcctctgctg   169794447
tcccccagga cattccactc tcttctctaa ggctcaggcc tgaggggttg   169794497
ctggtgggca gattccatct catggttgag ctgtttggcc tcaatggcat   169794547
tttatctctc tctctctctg tgtctctctc tttctctttt tttttttttc   169794597
acattgagcc atcttcttac agctgaggtt ttcatataaa aaagcaagtt   169794647
gctggtttct ctttaaaagt agggcaatct ggcagttctg ggcttgtgta   169794697
aaaacaattc ggtagagcta aaaacagggg cttctgataa agcctgagct   169794747
cccagcagcc aaaggactta tcaccccaca aaaaaatccc ttcctgcact   169794797
catttatatc aacccctgcc cctgcagaca cgtattgtag gttttaacta   169794847
gaaacaagag gattagcttt atttaaacag caaaactgct taaatgagat   169794897
aatatatgta ttgggaatgg tgcctggcac ctaacctaat ccttagttaa   169794947
ttaatattta ttgagcaaat catcttgatt attaaaaaga caggccagct   169794997
ggacacaata agaatgctag ctcagagctg gcacttgagg gttcggtaga   169795047
atattcatgg cttggaggtg gggctatga tacgagccca tataatcaga   169795097
gaagttcaga tgggaaatga gaaccacttg gtagcctaaa ttcagagaaa   169795147
ctaaagccag cctaacgctc tgaagctggc aagtgttcat ttttggaaat   169795197
cagaaagtga tgatgtgtta tcccaagaga ctcctgggac aagatgcagt   169795247
gagcagccat tcacaaagac taccttgaac cgggctcttt ccctacattt   169795297
tgttattata tcctcgctac aaccttctga ggtggaaatt aatatcccca   169795347
ttttacagat gcataaactg tctagtgagg gtgacagata gtattgacat   169795397
gaccagaaga ataaatataa atgagataaa ttctctctga aggaaaggaa   169795447
tagggattta caatggtgta aaacaaagga agtggggcct ggtctaagcg   169795497
atcagggaat gtctctttaa agaagtgaca tttaagctga ggtctaaagg   169795547
attagatgag tgttaaatag gaggagactg ggcaggaggg aaatcttctc   169795597
catggctctc aatccagaca cacaatttga accacctgag gttcacaaac   169795647
acaaagaaag tatcgtgacc tgatacagtc ccagtctaat taaatcagta   169795697
gaacccaggt gccgatgttt ttgtttcttt ttattttatt tattactatt   169795747
ttttgagatg gagtctcgct ctgtcaccca ggctggagta cagtggcaca   169795797
atcttggctc actgcaaccc ctgcctcctg ggttcgggcg attctcctgc   169795847
ctcagtctcc tgagtagctg ggattacagg cgcccaacat cacacctggc   169795897
taattattct atttttagta gagatgggat ttcaccatgt tggtcaggct   169795947
ggtctcggac ccctgacctc agatgatccg cccgcctcgg caccccaaag   169795997
tgctgggatt ataggcatga gccactgtac ctggctggta ccaatgtttt   169796047
taaaagcttt atggttgaac cactgaaatg aaacaaaaag taaatccaaa   169796097
gctcatatac tctagccaaa caatagccat taatagctat taagtaaata   169796147
gaggagatgc tcagtgataa tgagcaggta gatcatcagc atccttgtca   169796197
tcaccactac atctgcctcc tccagatcat ttggtagcca agtccaatgt   169796247
caaaggaata aaggaaatct gcctctgttg agggcttgct gtatgtcacg   169796297
cactatgcta aattcttcac tgtttcattt aacgtttacc gaaaccctta   169796347
ttattttaca aatgaggacg ttgaggctca gaacaaggca ccaatttacc   169796397
caggatttca cagctcatcg gggcagtggg ggaccctctt ccaggcccac   169796447
ctggctgtag agaccacact ctttcctgtc tccatgcaga ggggcctcct   169796497
gctcacttta gctcccattt cccagcctga ctgccttgat tgggccgcat   169796547
ttctttgttc tgacctcaaa aagagttttg tagatttgtg cccacttttc   169796597
tcatcacgct taagaaaagt gaccaaagct gaaccaagct atctaggttc   169796647
aaatgctgct tactggctat cgggccccaa actatctgtg gaacttcttt   169796697
```

FIG. 1.31

```
gagcctcaat tttttgtttt ctataacatg ggaataatat cagtacctcc 169796747
ctcataagtt tcttatgaag attaagtatg tatgtgttaa gattcatatt 169796797
aagtgagaat tacgcatgta cgcatataca tacaagatta agtatgtatg 169796847
taagcatata tatatacaca cacatttaga atagagcatg aaatatagcc 169796897
agtgttcagt taatgtcaag tattgttaat attatcctat gggctggagt 169796947
gagaggcctc ctggggtgtt tgctttccag cccccaatcg ggtggcatcc 169796997
tggatagggt atcatcatac ctctccccag gagatcagga tagggaattg 169797047
taagagcact caggttggag gtaggatgtg caccagggaa gctcaggcag 169797097
gaagctgctg tctttcctgg tctctgcaga ctaggagcag cagccaggga 169797147
cctgggttga ctgggggacg ggtcggtggg tggggtgaga tgactatcac 169797197
acctcctcta aaaacaagat ggggcctggt gcgctggctc atgtctgtaa 169797247
tcccagcact ttgggaggcc gaggcggatg gatcagttga ggtcaggagt 169797297
ttgagaccag cctggtcaac atggtgaaac cccatctcta cttaaaatac 169797347
aaaaatcagc cgggcgtggt ggcacgagcc tgtaatccca gctactcggg 169797397
aggctgaggc aggagaatca cttgaaccca ggaaggggag gttgcagtga 169797447
gccaaggtcg tgccactgaa ctccagcctg ggcgacagag cgagactcca 169797497
tctcaatcca tctatcagta aaatacagga tggaagggaa cgcccagctc 169797547
tcagtcagct gccagcccac ggccttggac gccactgatg tgagcctgtc 169797597
tgggctgggg cagaaggggc cagcgtcagg tcctcagaca atttcctcct 169797647
ggtagcctgg cctgaggccc acccaaccca gggagccggc cctggccagt 169797697
tgcagccagt accacctggt gcccagcaga gggcagcaca ggccacaggc 169797747
tggctttttc taggtgaaat tttgctacaa cgtgtagcct cttgggttcg 169797797
gtgtctcccc tgtacttctt tgcaggccgg agaagtcccg gacattatca 169797847
cagacaccct gcctcatccc cagcttctga ggtctttctg gactctgtta 169797897
gcatatttca gaggttcact gcaaaccaga aacgggactt tgagcttgtg 169797947
ttccagggca gagggcccca gcgcctgtag gtgcagacag cgcaccccca 169797997
acacccccga gtttccgcct cctcatctgg agagcggggc tggacaggat 169798047
ggtttttggg gctttttttgc aagctcaccg gggccaagtg agctatttcc 169798097
ccttgccatt ctctcccagg aggagaaggc ataagatgat gctgaaggca 169798147
caggctctgg aagaggacag ggccatgctt attcctgcct tgttatgtga 169798197
ttatggacaa gccttcactg acccttggag tgatggataa aatccgtacc 169798247
ccacagggtt acaggagaag taagtgaggg accacgtgca cggagcccag 169798297
caaggtgctc aggaaacaat gctattgttt ttcaggttac atcttgggga 169798347
gaccacccag aggaccttct ttcaaggaca ggtacctgga atttctctcc 169798397
ctttcctaca tcatcttctt gttttcatgc gcagggaggc caccactacc 169798447
tgagccagac cactcccttc ttaagccagg gcctgcaaat tgctgcagca 169798497
ctgcccccctc gatctcaatc agacacccac attcctgccc accatgccca 169798547
aagcccttca ttgaccaaga ccctggcctc gtcccaatcc tctgtaaagt 169798597
acacatgcgt cttcaatcca ccctacagga ctgtggagcc gagaagatgt 169798647
ggggctgagc atttaccttt ccataagttc tccagggggt tctgaggccc 169798697
acagaatcaa agagccactg ctctaggcaa tgagatagta ttctaaaaca 169798747
attaatgaag gcccatgatg gggacaggag agccattatg caaattccgg 169798797
ccattcgagg ttattaattt gcaggagaga ctgtagacgc tgggtaaaga 169798847
atgcccacaa tattaggcag tcaggaggct accctgcagg gcctgttcct 169798897
gctccgcctg gtgagcagaa aggtctcagg gaccagcttt aaaggatgac 169798947
aggcctccca ctgggtcaca gggcacagct gccaggactg aggccagaat 169798997
gaaggcgatc gcccatccgg ctcagtggtt ctcagtcttg ggtcagcact 169799047
ggaatcccca ggagggaaca cggaaacccc gagagctggc tccgccccta 169799097
gagctgacct cagtaaatct gagatgaggc cagagaaatt gcatttcgac 169799147
aagttcccag gtgttgcagc gcaggtgtgt gcatgcatgc atgcatgtgt 169799197
acttgtgtct gtgcccgtgc atgtgtgtgt tcccctgttt tctgctttct 169799247
gcagtgtttt agctcagact tcctgattgg ggtcccattc ttgaccagag 169799297
```

FIG. 1.32

gcccagtcta gacctagaag aatactaata catgcccagc tgtttagagc 169799347
ccacaagccc tctcatggcc cttgtttcca ggccccataa cagccccata 169799397
agtttgtttt aaaagtgcat ctgtagggga gaaaagattt ctttcctcat 169799447
ccatcactag gttcatggct gaggcacctg taacaaaaga cagactcaca 169799497
agagaaaagc aaccaagtaa tttaagtttt gtgtgacatg ggagccttga 169799547
gaaatgaaga cccaaagaaa cagggacatc tatgtgattt tttgccaagt 169799597
ttgatgaaga agcagataat tgtggagaag tataatcgga aaatgggggt 169799647
atgatttgat ggtaatgacc taagtggcat ttggaaggcc tgtttcttca 169799697
gattcttctc tgcgtctctg catcttcata gagaaggact ttccttccct 169799747
gtgggtctag ggaaggcacc tcttaaatga aggtttcatg acccacttga 169799797
gaataaattc aggaaattct tttatggcct gcttcagggg agaagggcag 169799847
gagaaggtca gagagcgacc ttccttcttc tgtggttttc tcaaatgcca 169799897
aggtggcaga tctgggacag tgtgtcctga actccctcac aaccatggct 169799947
gtctgcaggc cagtcactca acggccatga atgtgtattg acttgtgaga 169799997
tcctccaaac aaaccttcaa atctctgctc acccccattt gagagaccag 169800047
agatgagcca agagacatga agcaaccttc ccaagggagc agagccaaga 169800097
tttgaaccag ggctgttggg ccagtgagca agggcttgaa atccagtgca 169800147
gcacaggtat cttcctcagc aggctcagag acaggaggtg gaccggccgg 169800197
agcagaacgg accctcccct tcaaagcggg actctgccct tgagccctga 169800247
gcagccactc tggacagggt ccacagagga aggcaatcct ccagcccgcc 169800297
atgcttcctc tgacctcttc cctctctcag atggaactgc aagaagatcc 169800347
caaaccatcc aggtttcccc tacctctggg cctttgcaca gccttcagag 169800397
cagccctgag gtgatctcct gggccatcag cacatgaccg aacaaacctt 169800447
gggccaccaa gctccttccc cggagttggc tctgaggcca atcccccgat 169800497
ttcacaccat tttaccattc ctagccttgg tccctccaca gagcccctg 169800547
tttgctcccc gctgtgcttc ctggcaccag cctcagtatt tccagaaaca 169800597
catgcagaga ctcaaggctt ggaggactgg ctttatcgag aggctctgga 169800647
aggctctctg accccagtgg aatttggctc tctccgtccc tccagatgtt 169800697
actcaggccc caaaccttgc ccagccttgt tagtggcttc tccttcccac 169800747
acaggctgtg ccacccctte tccctcagcc tggaccccag accagtactg 169800797
agcttttcct gtcagcccct tgggtcactg cagacaaggc tctagtgttc 169800847
aaactctggc ttgagctcag agcagggccc actctgggct tgaaaatacc 169800897
tcgtgtgggg acagcagggc acactggaga ggtgaggagg gtctcctgtc 169800947
ctaggctgag gagctggccc agaggcagcc ctggcctcct cgccactccc 169800997
ctgaaatcaa ttcctcatct gagggagctt tctaaaataa aatttaaaaa 169801047
ttgcccacgg acctgcccag cttaaagcct ttgcaaggct gctcttgacc 169801097
ccagcatgaa acccaagctc ctctccatcc tggctgccaa ggccccaagc 169801147
cactcgccca gcccaccagc ctcaccacac tcccatagac ttccccactc 169801197
ttgggtgggg gtgggagggc tacacgaagc tctaaagtca gcccgtgctc 169801247
tttctcaccc ccaagccatt gcacagcctg ctcccttggt ctagaacact 169801297
ccctgtatct gacttcgaca tgtttcttcc tccaggaagc cctccctgat 169801347
gccccattcc ccctccaagg actgcccagc atctggagca ccctgtaccg 169801397
agcggcacac tgtggtgctg gaaacatcct tgttgtactc ctctgtgcct 169801447
ggacactgca tgtgggcctg tccatacgcc acccagaccc ctcgggtacc 169801497
tttcaccatt tctgagcact cttcccctgg cttctgtgtg tttttgcttc 169801547
taagaatctg ttgggaagaa aatattccct ctctatcaac ttagatccta 169801597
gtggtagggt ggagggctac aaatcaactg acaatggaca gattcacagg 169801647
agaaaaaaac aatcagttgt actcacatgc ctggggaaga ctgaacagct 169801697
gggaataagg gcttctatac ccacttaata aaccgggtga actgaatggg 169801747
gttagggctg ctgtggaggc ccaggaatca atcagaagcc ttcagctttc 169801797
acctcccatc ccccgttccc tgaccccatg ccaccagatg caaataagaa 169801847
ggaaacttta attccacaaa ttgaagcatt tatgaagctc agcaggcaac 169801897

FIG. 1.33

```
ctggcaggca ggcaggcaca agtgaggaac aagggccccg ggctgggctg  169801947
ccttccaggc aggtcccctc gacacaggcc actgcagctc tctcctgcaa  169801997
tgtgtcagga gagcctggca caatgtgggg gacgggggcg ggggggtgcg  169802047
gagcttggca ccacctggtg gtctcagctg ccactccaca cgtaggaggc  169802097
tggatgcctg ctggggcaga aggcggaatc cagcctgacc acttagtggg  169802147
gctcatctac gcaagccttg ggagcagtgg caggctgctg tgaggggcgc  169802197
gctagcctga ggaaccctca gcctcagtac tcctgggtcg agctgcagga  169802247
gcaggcctgg caagtcccta aggcttccag caacattccc cttccccagg  169802297
cttggcagtg ccagcccaca actcagtcat gggacaccag gtgggctcct  169802347
ttcttgtggg cctggggcag tctgctgaga agaagtgggc ttgcagcctt  169802397
gagggggatt agatcctgga ggagaggccc atcccttcct tcatacaacc  169802447
ggggtatggc tggctgtcca caggcggcca tccccgtgcc acaggctgag  169802497
ttctgtcttc cccaaactca cgtgctgaag gcaggacctt gcaatgggac  169802547
tgttcttgga gacagggcct ttaaaggggt aactacatta aagtgaggtc  169802597
attaggttgg gccctcatcc catgtgactt gtatcttcat gcgaagagaa  169802647
taagacatag acacacacac aaaggtaaga ccacgtgaag acacggagaa  169802697
ggcggcgtct gcaaaccaag gagagaggcc tcaggggaaa ccaacctgct  169802747
gacaccttca tctcagactt ccgggctcca gcactggaag aaaatgaatt  169802797
tttgtttaag ccgcccagtc tgtggcacct tattatatca gcctgagcaa  169802847
accaatacac aagggcccag atacctaaac agaaaagtgt gataaggcca  169802897
tttaaaccac aaatacacag cgggggtccc agatcccaga gcagggtctc  169802947
agttatttca cagatcacaa aactgaggat gctgaggaag gggcctcccc  169802997
caaggccaca caacaacttg gaggaaacac ggaactgaag gaaattgatt  169803047
cccaggggag ggcccttgcc tgacccctc ctaggggaga gtcagagggt  169803097
ttccaggagc atgaggatgc tgagactaca ggactacaga tggagggtgt  169803147
ttcatggctg agtgaagggg tagaagccag gcgagtatga cacaggatcc  169803197
ctcttgacag aattagaaca cagagatctg gagttcccat catgccccta  169803247
ccacagattc atggtggaaa cttgggcctc atctgcttat ctctgaagtg  169803297
cagaaattta tagcacctac ctccagggag agttggggggt taactgagat  169803347
cacgatgtac aaacctgtaa gctgtaaggc aatggaaaag tggagggtat  169803397
gtccttggat gaagcttccg ctctggacag catggaggac ccaggagtca  169803447
ggctgggctg ctggctcaca ggtgttctct cccccctggcc caatgccctg  169803497
gttcccattg ccgtctgagc tcctcccttc catgtctctg ttcttgcttc  169803547
cttccctcgg tctgccgtcg ccctttgtca gtgatcagac gtgaccatgg  169803597
gtaacaggca tgaattttag tctctgcatg ctcaggtgtg taagaaacat  169803647
ggcttccttt agttcctata actaaacttt attttcagtt tgcactgatc  169803697
ttcctccagc tgccctccca gcccagcagg gcctctgccc tggcagggat  169803747
gggatcagaa ctcaaagccc ctttcatgca accgtgtgtg cacagttaca  169803797
cacagatctg tctaaaatct aactagtagg aagcagtgag aacttggtgc  169803847
tttgtagaga ggctttgtga ttcagataac agggctagct ccagggagtg  169803897
tggaacaaac gagacccctg agggcacaga cacctcagag catttgtacc  169803947
tctggtgctg gggaggggtg gggggcccat ctgtgagcct ctggtgccca  169803997
tgtgcccacg tgcagggttt gtatctttgt gcactttgta cctctgtgtg  169804047
gcaggcgatc aatggtgttt ctatctcagc cagggactca ggtgcgagac  169804097
tgagaagccc aggaggcaag aggcacctgc agccctagag cccactgcag  169804147
attttccttg agggccgtat atccagaacc atcccagggc ttggcttttg  169804197
agagaaaatg tagtcttaaa gaatgaacaa gtgggccggg cgccgtggct  169804247
cacgcctgta atcccagcac tttgggaggt cacgaggtca gaagatggag  169804297
accatcctgg ccaacacagt gaagccccgt ctgtactaaa aatacaaaaa  169804347
aactagctgg gcatggtggc gggcacctgt agtcctagct actcgggagg  169804397
ctgaggcagg agaatggcgt gaacccagga ggccgagctt gcagtgagcc  169804447
aagatcgtgc cactgcactc cagcctgggt gacagagcga gactccatct  169804497
```

FIG. 1.34

caaaaaaaaa aaaaaaaaaa aaaaagaatg aacaactgct gactactgtt 169804547
tactacaata agcatagctg atactctatc caggaagagg aagccaccac 169804597
tcagtgcccc agccaagatt gttctcaagc ttttgtccgt cccaaacctt 169804647
tatgaagcat cctcacccac tgacatgtgc agtacttaag acggtgcacc 169804697
ctggagtcaa atcccagctt ggccccacat gagctctgag gcccttgagg 169804747
agacagcgtt gcaaagaccc caggggccga gtaagcagag gcctttcaga 169804797
gatcagagaa aaggccacat agctgggagc ctttgtgaaa ctggagaggt 169804847
catcggggcc agatcctcag gggcccagtg gccctggaaa ggaatctggt 169804897
cttgtaccta gaaatggtgg cattaattat gtgactttgt ccaagtcgct 169804947
gtcctattct gagcttcagt tttcttgtct gcaaagggct ctggaccaaa 169804997
ccatctagga tccaccctga ccctgggcct tcatgtcagg ttaaggagag 169805047
acagggcctc gttctgcgtt caggatgagt ttctccaggg aaaggccttc 169805097
tagctccgcc ctgccctgtc tggctctggg gaccacgcag gactctcaag 169805147
acactaggtc actacactca ggagtttccc atttctgcca agacaatctg 169805197
gagaagacat caccccactt gagtcatgag atgtcctcaa cagcaccttc 169805247
tagagtgcag atctttttgc tgctgtgaga gaggggctta tgcagaatga 169805297
tattgtcagt gtagacatgt ttcacacaga ggagaactca ggacagggga 169805347
caggaatgga ggcaggaact cgatctatta gaacaagttt tctgatgtgg 169805397
ttatgcatca gggatgtaga atcctgtgcc ttcaggattt ctgggattaa 169805447
agacaatccc agaaaacagg cctggacagg tcctggaatc agccccaggc 169805497
ctatttggat aggggattct ggggtcctcg tacccagagc ctggtctaga 169805547
cagaaggagg gagtgggctc tgggtgggca aacccacctt ggccctttcc 169805597
cttccctcat cctgtgggga ggggctcagc tagtggaggg tcagagaggg 169805647
tctaaagcag gggttccatg gtaggcaccc ctcttgtcca gacccaaagg 169805697
tggcttggat caccaccgag gcacagctga gtgataagtt gatgagcagc 169805747
tgtgttttgc tgccacataa aaatggctca ttccccaccc cccggccctg 169805797
aagtgactat ttactgagag aggcaaccct actgaacaaa agcctgctat 169805847
ttattacacg ttcggtgaac accccacagt tccaatgcat ggggagggct 169805897
tggaaaccaa atcaaccttg ggaaaaggag gtgcagaggc caaggtcaaa 169805947
accaattcat ggaagtggga agaaagcagg gctggcctca acctttcac 169805997
tattagagag atggccatgt aaagtagtga gcctcctgtg gaaggcatat 169806047
gcaagaacag gtagaatgat tatttcttag gggttttgta gaaaggattc 169806097
cttacacaca aaggcacagg attctacatc cctggagcat aactacatca 169806147
gaaaacttgt tgtaatagat tgagttcctg ccaccactcc tgtcctcgtc 169806197
ctgagttctc ctctgtgtga aacatgtcta gactgacaat gtcattctgc 169806247
ataagcccct ctttcacagc agcaaaaaga tctgcaccct agaaggtgct 169806297
gttgaggaca tctcatgatg caaatgaagc agctgcttgc aggagccatg 169806347
gaggggcttg ggcagcaggc ggggggtgcc cacaggcatg tgcccctcca 169806397
gaaatgggca ggaagtggaa ggaagagaaa gggagtcagg cccagggcag 169806447
gggtgggggc tggggtctgc tttctccaca ctgccaggtt ctggtgagga 169806497
cctcccaggt gggtgtaaat ttgcaaaccc aaatggttaa gaagatatat 169806547
ctgttaatgt agaacatttt gtatttaacc agtaattgac ttgattcata 169806597
actttaagta tgcagatgtg gtaagtggac ctcagtatta gcttcctatt 169806647
gccactggaa caaatgacca gaaacttcgt ggcttcaaac aacacacctt 169806697
tattatctga catttctggg ggtcagaaat ccaaaatgac tctccctggg 169806747
ctggatccgg gtgttggcag agctgcgttc cttctggggt cctgggggaa 169806797
gcctgtttcc ttgccttttc cagtgtctag aggctgaccc cattctttgg 169806847
ctcatggcct cttcctccgt cttcaaagcc agcagtgttg ggccgagtct 169806897
ttctcaggct gctacctctg ttctctctct cgtgcctccc tatgtcattt 169806947
gtcaagaccc agaggattcc acaggcctac ccagataacc cggggtaatc 169806997
ttcccacttt aaagccagct gattgacaac cttaatccca tccacaacct 169807047
ctgtgaccct ctgccatgca aggtaacata ctcacaggca tagggatgag 169807097

FIG. 1.35

gatgcggatg tctttagagg gccactgttt tgcctaccac agcttccatt 169807147
tggattcttg tcccaacccc tacaaaagtg aggcatataa tttgttgaat 169807197
tctgaataaa atgctaccag tgtctacaaa ttatattttt tctttttta 169807247
aaaaaaaaaa aaaaccttct tccccaagtc tggtttcctt tagacctcag 169807297
gactaagtac ctgagaagat ctgcgggcaa ggatagttat gtgattatct 169807347
ggacagaatg gcatttctga ttgacattgt tgcattactt tggctccaga 169807397
tgcagtggcc tgagagcaga aataaaaccc cctccagctg cctcagccca 169807447
ccctttgcag agggagaatt gagttggggc cacacggtgg gaagcactaa 169807497
tcctcagtcc acacaaaccc tcgctttcca attattttga tggaagtcat 169807547
gaaagagcac tcagctaggc attattaatc catttttca attcagcaag 169807597
tattgattga gcagctaccc tgtgccagtg aggttggaaa cacaagggtg 169807647
atgaacaagg tacatgtgcc tggccgtcac tggccagctc tgtcactgca 169807697
ggcgggaact ttccttcctg tggggcccag ggttttataa tcacatgagc 169807747
acctacacat ccggtacaga gccccgttaa gggggcaggg cctggcctgc 169807797
ctccttcact gttgtctcca attgcctcag atgcatgtgg atgctcattc 169807847
gttgaatgaa tgaatgaata gatggtcctt gctgatcgga gagtcaatga 169807897
ctgtatcagg ccaactggaa aagcagaggg caagccaaga gaagacttgg 169807947
acagtgcctg ccaccatggc tgcgagtgag aggactgcgg atcccgaggt 169807997
ggattcctgg ggtggcagct actgtttaca aagcactttg ctggtattta 169808047
ttaggccacg cagttcccttt ccaagtttcc tcctgttatc attctcactt 169808097
tgcaaatgaa gaaactgagg tactgggata aaacttgctg aagaccacat 169808147
ggctagtaag tgtcagagct tggatgtgaa cctgaatgct cgctgaggag 169808197
agagcagctc gcctccttcc ctcacaggca catagtcagc cttcccgaat 169808247
ttcatccggc aacaattaac ctctcccttc tcactatccc ccgctccctt 169808297
tccatctgta gagatctcct tggatctaaa ttatcagggc ctaaagccag 169808347
gccatactac cgaggttaaa gaaggtgaaa gggctgcatt gggcaacatt 169808397
gttccttcaa tcctaactct ttaatcctaa ttcatcactg cacactctgc 169808447
tcccttccct gggtgaagac agtttgattt gcccagtatc cagaaagttt 169808497
gtgctaagac aagggaaatt gccacatggc tctctgtttc attcagtcct 169808547
tcataagcat gcagcctgac ctggagaaac tgacagtgta aaatgcatgg 169808597
agcagctcct gtccctctct ttcctaccct tgagcactct ctaagcagta 169808647
gctggccgat acagtcgccc aggaagtctc cctgtagctc ggccgtcagt 169808697
cattaccctc actggcagca cgggacagag aacgggatat gttctcccct 169808747
tttattttgt gtggtgagac ttggaaaact ctgcgcctag aaaaatccat 169808797
ttctgaaggt tgctgctatt gagtagtgca gtgagactgg gtttgaaggt 169808847
attggactct tacataggct atgtgaacgt gggcaaattg catcttctct 169808897
ttgagaagtc tgagctcaag tcttgctttg agttatttgt gtactaacct 169808947
ttgaccttgc tgacaaaaaa aaaaaaaatc acagtgctgg gtacagctcc 169808997
tgacactcca cctcccctac ttcttttta gatacagggt cttgctctgt 169809047
tgcccaggct aaagtacatt ggtgcaatca tagctcactg cagccttgaa 169809097
cttctgcctc aaacaatcct cccacctcag cctcacgagt aggtgggact 169809147
acaggtgtac tagtatgccc agctattttt atttatttat tttgctgtcc 169809197
atcctgatct ggaactcctg ggctcaagca atcctcctgc ctcggcctcc 169809247
caaaatgctg ggattacagg catgaggcac tgcacccagc ctcaacttct 169809297
cccacttcta tcttctcccc agttctaggt gaggcaggac ctgccacatg 169809347
tccaaatctc catctgtccc cagcactcta ctaaatggct taactgggcc 169809397
ctcacgtccc tccctgggga tcctgtgaaa agacttgtga acctgctcca 169809447
ggtcctgact gaaccaaatt tcctctctct acatgccgaa agagtaatag 169809497
gtgttcctgc attaagcaat ggcttaattt aggtttattt tcattcttca 169809547
gatatctctc ccatttgatg tttcaccccc ttgaagctca ggtgaatctc 169809597
catcttctta ttcatctgaa tattcctcat gcctggcatc acgcctcact 169809647
catagagtag gaattcaaaa acatcccagt aggagctggg aaagctccta 169809697

FIG. 1.36

ctgcatgtct tgtacatctg ctgtatgcca gctgggaaag ctcctactgc 169809747
aagagagagg caaaccacaa aggggactaa ggggaagaat tgggaggggg 169809797
gcatttattg ccccaaatga ctgaatttgg gtcaaataac aggaccacgg 169809847
gcactcacat gttcaagtta tgttcaggaa tcttcctgtt ttctttatga 169809897
agcagaccct acctctcatc ataaagctgg aaatgccacg ttccctccat 169809947
tccagcctct cttgcagcta tggtgagcct aaatgagcta gactcagtca 169809997
atcaaacccct tctgccctag agtttgaatg ggaagttctg acttgaagaa 169810047
ttaggaacca cacaggaccc cgtttgtgaa gggggtggca caaggtgcgt 169810097
ggcctctagc tcccaggggc agcatccaga attcagcctc agggatgttg 169810147
gtcatgcaag ccaccaaatc agtgccagca gccaagacgg gggtgtcttc 169810197
acagggccag tttcgtcatg ttatttcaag ggttgctcct ggcccgtagc 169810247
ctctgaattt attttagttt ctcagagatt tcagtgggcc aacgaatgtc 169810297
acttaatcga tccctttcct gcttggagga gccagactcc gtgtttgttg 169810347
cttacaaatg agaccttgac tgagacaagt tgtcttgagt ttccagttga 169810397
agtcatccta ttccctttca ccttgaggcc tttgcacatg tcatttctct 169810447
cacctggagc aggcattcac cctcttttg tgactggatg actcctaccc 169810497
agtcatccaa gggtcaggct tgaagactct tcccctgaga agccctccca 169810547
gatcacccca aatctgggct cccacaccac cctgcatgtt cctcttagta 169810597
gcatcctgac cctggatttt actgtttatt tctgtgtttc ctcactattc 169810647
tgtgagctgc atgaggacag aagtgcatct atttcatcat tgttagtagt 169810697
agttagtata gttgcccagc ctattgatat tgttgaatga gtggatggat 169810747
tgaactctct taggccagag tgatccccca ctatcactgc ctggcagcat 169810797
ggagcagctt cagtttttgg actcagggca attgccctgt tccaggaaac 169810847
cccaaaatag agttgcctca tttcacttct accagcatgt cttgtacatc 169810897
tgctgtacgc caggccccgt gtcctcttac gcccacatcc cagatcctgc 169810947
aggtagaagt gctcacattg ctgtgctccc ttttctctga ccagccatgg 169810997
aggccctggg ggcttggagg agtggctgct tactccctgg gggaagtgtg 169811047
ggctgcaagc cccttgagtg ggcaggttgc catggtgatg ctaatggaga 169811097
gacttgcctg aggaatactg accaccaaaa ggaacaatta ccagagaagg 169811147
cccatttctt tagcaatttt caagaatggg caagataaaa agccacaagt 169811197
gaaaaggcat tgcaaacaaa taatagtgta tgagctggtc tggacccaac 169811247
aaggcctgtt tcccacccct ctttccctct ggttgtagtg aataaagcca 169811297
tacttttcag tgatttataa ctgttcaaaa atgactcgtt tccatatctt 169811347
ctttcatcta cccagcaccc attatgtacc aaatgcctaa cagacactta 169811397
aaatatactc tataattatg aaaacaaccc tacaaggtaa ttgttcccgt 169811447
attacagatg agaacactga ggctcaggga gtgtaaggga cccgtctagg 169811497
gctacgcagc tgggaagcac atgcagcact ctacttcatg cttaattcaa 169811547
ggaagcgaat tctccttgtg ggttaacatc atcacagtgg caattccagt 169811597
gcctccataa gaaagtgtcc ttggaaatga gacactagcc ctctcctgtc 169811647
tcatctgcac aatatcctat tgccatctat ttagaagaga ggtagtgagt 169811697
tggttcattc attcattctc catttgttca ttcatacaca tttattacac 169811747
tcaaacttct agggcaaaac cagcaagccc cgtactggac acttcagact 169811797
caaagatagc aacttgctaa gttacaggag cttcctcata attgctgagc 169811847
ttctaagctc tttgtcccaa ctcctgaaaa gtagccctca acttccaaac 169811897
tgtgcttcgg gcactgacat tccctgagct ccacacaccc ttggaccaca 169811947
gttttctgag gcccagatga gcacaatgtg cagggcagag cctggcactt 169811997
ccagggctcc aaggagtcca gaggaaaatc gggcaggtcc tgaatcaggc 169812047
tgctgtaggt tgaactcctg ccccacttag cagctggatg atgtgcaaat 169812097
tgctcagcct ctctgtgctt cagtttcctc acctataacc tagggctaaa 169812147
aattagaagc acctactcca tacagctatt gtgctgatac aatacaataa 169812197
tccacataag gaacttagaa cagaacagtg ccggcggtgt atgttaaatg 169812247
ctgagtggac accagttggg attagaagta gcagcattgc caggtactcc 169812297

FIG. 1.37

```
tgagcaatgg gtcagctaat tccactctac cctcagaccc caccctcctt  169812347
tgcagttcct tctcctgctt tgataactag aagcagtcat atagggcctg  169812397
gggtctctac ttgtaggagt tcagtcaggg tggtaggaaa aattataaaa  169812447
attatagaaa gactcaaacc ttcttggaag gccgggaggt tttgcaaaag  169812497
ttttgggaaa ggatttggct gaaggcagct gaattttctc agagtaaata  169812547
acaaggaagt gtaagggaat taatctagat aagttagttt acttaggcct  169812597
tgaaacatgg cctttaatca tccatgctca ggactgctct cttgggggaa  169812647
aggatcgccc gaccccccac cccaccctca ccccaccccc tgccaccatg  169812697
ttaattaccc acaagtgtgt tgactcaaag cctttgtcat taaatctgta  169812747
ctgaatatat gcccacagca ccagcttgtc aaggctgcag ctgctgactc  169812797
tttacagcac cctcctcggt gcctgtgagt ggcccagtcc cttagccgtg  169812847
cagccaggca aaaaatctgt gtctgcatac atttttcat ccatcactca  169812897
gccagggtct gcgggttgga ccccgcatct actcacaaat caagatgttc  169812947
agttccgcca cccacccctg tctgtcttcc tttctcacag tcactctgta  169812997
ggtgtatcct gaaaatgtaa atcagaccac agcattccct agctgaaaac  169813047
ccttccgtgg ctccctatta ctcaccatag gctaaattcc gcccagactc  169813097
ctctgaaggg cttgcaaggc ctcctgtgtt ctagctcctg cctgctatcc  169813147
acccacaccc ctcattcctg cccctgtaaa cccсttgtag ctctcacatc  169813197
tcaagaatta aagatttgac ccagttgctc cgaccacctc cgccccgatc  169813247
cccagaaaca gtttccccct tctctttctc tggccaactt ctatcggttt  169813297
tcagaatgtc tcccctggcc acgcaggatc ccttccattt tgaggctgat  169813347
aaaatcctgc ggatcgcaag ctgagcgctc atcacacccc atcgtgatta  169813397
tctcccctgc aaggccaggg gctttgagag ggtgggactg tggctgacac  169813447
gttcagtgct ccagtcccat cacctgacac ttgccataga gaaggtgctt  169813497
agtatttaga agagtgtgtg cgattaccga gagcatggat atgaagaagg  169813547
ggatcacaac cttgaaaaag tttgttgctg agaaagaggc aagcagcccc  169813597
aactgacggg agctggcctg gtcctcacag tttgtctcct gttgaacaat  169813647
ttcacagaac attgacatca gacaaggcta ttctgactgt gttggagcaa  169813697
gacaaaatcg agagcacttc gtagtcatgt ctaaacgcag ataaaacaag  169813747
aacattgtct aaaccacaaa aatgaccaga catcccgctt ttttgggcta  169813797
atgggagtaa ctgtttacca atgtttataa tgttggccct gcactagtcc  169813847
ttctacctta tagataagat tataggtacc caattataga atgattccta  169813897
ctgcctgatg gcatccaatt gaaccctccc tagtcactta acacaagccc  169813947
ccatcctttt gtaagttctt cgtaacaccc tctcacaaag accсctcact  169813997
gttccccaca gtgcacaatc tccttgctgc aatgagccaa taaacccagc  169814047
tccgttcaac tgcaggtgtg ttcctggtct ttggctaaag ggcattgaca  169814097
ccacccattt cccagaaacc tgaacttgca aaaaaaaaaa aatacctaat  169814147
taaacaattt ctgcaagcta attgatagtg agaaatgtat ttctgatagg  169814197
gagcatcagc tggagtagac aactttgtac atactatatg ttttccggac  169814247
agttgcttca gcttctcctg cattgtgtgt gtgtgtgtgt gtgtgtgtgt  169814297
gtgtgtgtgt gtgtgtgtgt ttgcaggggg aagatgcaag ctttgctgtc  169814347
ctgggtgtcc gtgactgggc atgtctcatc tggaaagaga tcagctaata  169814397
ttccttgaga aaaagaatgt tatcactgga tgattacatc tgcttccaga  169814447
gaggtaagag catgcagcat ggagcagaca ctctctatcc caggagctgc  169814497
cctgcccagg cctgggctgg tggctattgt catggagtgg taactgtaag  169814547
gccatcctca taagtcctgc tgatatcact ccaatccatg gacacccctg  169814597
tgactccgtc tccattcctc aggcctgctt cccatggaaa gacccagagg  169814647
gaaacgtggt tggtggcatt ggggactgag aacagaacaa aattcaggct  169814697
ttgagtgtgg attagagacg cactgtgtgg tgcttgcatc acctctgaca  169814747
gtggttgggt aatgggctga atcacccaat ggagacagaa tgccaacaga  169814797
tgttagttga ggaggatgat taatctcctt cttcgaaaac tcagagaatc  169814847
tttattggca acgttgaagt caagataggg cttctcctta gcaaccggaa  169814897
```

FIG. 1.38

agcgcctagt gtgcatggct acagaattca atatgaaact cagatgatga 169814947
aggtagccat gggcacctct gattgcccat tgtaaatttc tgcctggaat 169814997
gagggctggg gcctcataaa tgtcaacaaa agctggtgat gggtccagag 169815047
agggatgtta ggccagcctt gatggatgag gaagtttcat ttaggggctc 169815097
ctgtcacttc ccatcttcag gccaagctga catccatggc tgtaaaattg 169815147
tcacccttct cctttgcctc tcaggaaagc aaaacttctt tacgacactt 169815197
ttaatcaaat ctgtcttttg ccacttctct ccccaccctg ctccctctgc 169815247
ctttatcctg acaaagaagc gaactgttac tctctgtcag ttatttgtct 169815297
gagtaatttc ttgatgaaat tgcaactata attgaatttt ctgaaaacca 169815347
ggaattcaaa tgaggcgaca acagaggaaa cagcgtgatt aaggaattgt 169815397
tattcactcg ttgtacatca ttaccaccca gaattcatcg ctggatcgtt 169815447
cacagatgga gttgctgaac tatgattata ttttagaaaa tgaaggggga 169815497
aaaatctaaa aaggcaataa aacatattag aagccttctt gaggaacagg 169815547
attattactg attaagtata ttttgcatga aaaatgtgct agcactttgg 169815597
cagtttaaat tatacgtccg tgcagtcaac atttttgctg gtctcaaaat 169815647
tctttgttag tttggtcttc taatcacatt cctcttcacc ctccaaattg 169815697
acgacttgaa agaacattag aaatgatcat tcctgaagga gcatttgctc 169815747
tcaaaatgca tttacgctca gcagccatta aaaggatatc atccagtcac 169815797
ttagtttctc aatttaactt taaaggaaag ttgccttatt agagaagtgg 169815847
cctctatttc aatgtaatgg tctttgtcac atcttccaat gtgctggctt 169815897
agtgctgaag gatggggaaa ggcagttttc acatattgca gccaccatac 169815947
caccaaagaa aacaggtgca cttccaggca tcatttagcg gggtaccaca 169815997
ttcctggttc cagtttcctt tttagaaaat ctgaaagtaa ctttggggca 169816047
tatcttttaa ggagtactcc aacacgacta gtggacagac cctaaattaa 169816097
ttgccaatca gctctgcctt ctggtattta cacctttatg taataacctc 169816147
cacttgaagg tagatgagat ctgtgacttg cttctaacca gtggaatatg 169816197
gcggaggtgg tgggacgtta ctcctgtgat tacattacat catgtggctc 169816247
ctttatgatg gaagattcat gctagagatt ctccttgctg acttgacaaa 169816297
gtatgtaacc atgatgaaga cttccacgtg gcaaggagct gtgggaagcc 169816347
caggtgctga gactggcatc cagcaaacac ccagcaagaa acagacgtcc 169816397
ttggttctac acatacagga aatgaattct gccaacatcc tgagtaaggc 169816447
tggaactaga ttctccccaa gttgagcctg acaagtaaaa tacagaccag 169816497
ccaacacctt gattgcagtc ttgtgagacc tggggaaaag gacacagctg 169816547
aaccgtgtcc attcttctga cccacagaaa ctgtcacatc ataaaggtat 169816597
gttagttgtt acacagttta gaaaactatt acagctgctc aagaaggtta 169816647
gctagctcca gatttcaatc cattcacagg aaagcaagct ttattcctag 169816697
aagaataatt catgctttgc aaaaagagga aaacgtcctg cagttttaga 169816747
aggtcttttc tttctcaaca caccccaaatt tctttaaaat cctcaagaag 169816797
tgcatttgtt ttcatggttg actcgaagaa gtgagtataa ttaactcaca 169816847
aaaggtggga ggaagggaca aattaaattt tggtatgcat acaggtagct 169816897
tcttccaagt gataatgagc aatgtgaaac aaagagattg gcattaaatg 169816947
taatgaagga ctagaggagt gtacctaaac ctgaaacaaa ttccaagaag 169816997
tggccttgac ctaaaatgtt tgcatcctgc cagagaccct tacttataag 169817047
tcaggagata cctgatgccc aggagaactg gtttttgtac tctgtcttac 169817097
acagactaag aattaagaat gcaggtgaga agtttagaaa acttcctgat 169817147
gatcatatga aaagacatta aactttacct ggtaaaacta tgaaatgttg 169817197
cctgtagatt tctaagaaaa atgagtagga agttggaaat atttcagaat 169817247
taagaatgtt tttatataat tagaactctt taagctatgt aattctgaaa 169817297
tctgtgtgac agacttctgt gtaaacataa agaactagtt atttttacag 169817347
attatctagt ctgtgtattc atttgatgtt tctattactt ttaccctcac 169817397
tacaaagttc aatgaaggtt aaaaaaatat tgttcttaaa aaaagaagag 169817447
ataaacctgg agtagctatt tcaatgttag acaaaatgga ttttaaaaca 169817497

FIG. 1.39

aaaatgttaa tacagataga aagggacatt ttataataat aaaagtatca 169817547
aaatatcagg aagataccac aattataaac aaatatgctc ctaaaaatag 169817597
aatctcaaaa tacataaaac aaaaactgac aaagttgaag ggataaataa 169817647
ataggcagct cagcaatatt tagaaacttc aatacctcac tttcaataat 169817697
ggatagaaca actagacata agatcaacaa gaaaatagaa tattttaaca 169817747
aagctataca ccaactaggc ctaatggata tctatagaat aatccaccca 169817797
acaacagaag tcttcctcct cctacttctc ctcctcctcc ccttcccctt 169817847
ccccttcccc ttcttcttct tccttcttct ctttctcctt ctccttcttc 169817897
ttcttcttca acaggatctt actctgttgc ccaggctaga gtgcagtggt 169817947
gtgatcatgg ctcactgcag cctcaacttc ccaggctcag gtgatacatg 169817997
ggcctcagct tcccaaagtg ctgggattat aggcacaagc cacatgcctg 169818047
gcccacatat tcttcttaag tacacatcaa acattctgta gaatagacca 169818097
tatgctaggc cacaaaacaa gcttcgataa tttaaaagga ctgaaattat 169818147
acacaatctg ttccttggcc acaaagaata aaattagaaa gaacttttgg 169818197
aaactcacaa ctatatagaa attaacatac ccataagtaa ccaattggtt 169818247
gaagaagaaa tcacaaaata aatgagaaaa tactttgaga tgaatgaaaa 169818297
ttaagacaca acatataaaa atttatgcaa tatagctaaa gcaatgctta 169818347
gagggaaatt tatagctcca catacctaca ttaaaaatgg agaaagttac 169818397
actgttggtg ggactgtaaa ttagttcaac cactgtggaa gacaatatgg 169818447
cgattcctca aggatctaga accagaaata ccatttgacc cagcaatccc 169818497
attactgggt atacacccaa aggattataa atcattctac tataaagaca 169818547
catgcataca tatatttatt gaggcactat ttccaatggc aaagacttgg 169818597
aaccaaccca aatgcccatc aatgatagac tggacaaaga aaatgtggca 169818647
catatacacc atggaatact atgcagccat aaaaaagaat gagtttatgt 169818697
cctttgcagg gacatagatg aagctggaag ccatcattct cagcaaactg 169818747
acacaggaac agataaacaa acaccacata ttctcactca taagtgggag 169818797
ttgaacaatg agtacacatg gacacaggga ggggaacatc acacaccggg 169818847
gcctgtcgga gggtgggggg caagtggagg gagagcatta ggacaaatac 169818897
ctcatgcata tggggtttaa aacctagatg acaggttgat aggtgcagca 169818947
aaccaccatg gcacatgtat acctgtgtaa caaacctgca cattctgcac 169818997
atgtatcccc aaacttagag taaaattttt ttaaaaaaag aaaaaacatc 169819047
tcatatcaat aagctagact tctatcttaa gacgctaggg gaaaagcagc 169819097
aaactaatcc taaagcaagc agaaggaaga caataatgaa agtggaaatt 169819147
aatgaaattg aggacagaaa aacaatagag aatatcactg aaaccaaaaa 169819197
gtggttcttg ttttctttct ttctctttct ttctttctct ctctctctct 169819247
ttttctttct ttctttcttt ctttcttgtt tcttttgaga caaggtctag 169819297
ctctgtcact caggctggag tgcagtggtg caatcacagc tcactgcagc 169819347
ctcgatctcc tggacttaag tgatcctcct acctcagact ctcgagtagc 169819397
tggaaccaca ggagtgcacc accatgtcca gctaatgttt tcaatttttt 169819447
gtagagatga ggtttcccta tgttgcccag gctggtctca aattcctagg 169819497
ctcaagcgat cctcctgcct cagcctctca aaatgctgag ccaccacacc 169819547
cagctggtta tttcaaaaga tgagcaaaag tgacaagctt ttagctaaac 169819597
tgaccaagaa aaaaagaata cttaaattac cataatcagg aaagaatgag 169819647
agaacattac taccaacctc atagatacaa aaagtataga ggaatacaac 169819697
aagccaattg atatgccaac aaattaaatt acaaatgaaa tggacaaatt 169819747
cttagaaaga cacaaactac aaaaactgac tcaagtagaa atagaaaatc 169819797
taaataggta tttaaaaaag attattaaac tgagagctga agacagggca 169819847
gcaaaactgc aggggccacc accaccacca ccacatgtca ggaagagtac 169819897
ggagaggccc tggaggggca taacgactgc aggaataaat taggagagcc 169819947
aagagaaccc acagaccctc tgaaggaagt ggattgctcc tgcaggacct 169819997
gggagacacc tcaaatactg tgctggtatc tgtggctgag aaacccacag 169820047
atggtttgca tcacaggact ctgtacagac aaccccagt accagcctgg 169820097

FIG. 1.40

aacctggtag acatcctggg tggctagatc cagaagagag ataacaatca 169820147
ctacagctcg gctctcagga agccacatcc ctaggaaaag ggggagagta 169820197
atacatcaag ggaacacccc atgggacaaa agaatctgaa caacagcctc 169820247
gagccctagg ccttccatct gacagacact acacaaatga ggaggaacca 169820297
gaaacccaac tctagtaata tgacaaaaca aggttcctta ataccccca 169820347
aaaaatcaca ctaggtcacc agcaatggat gcaaaccaag aagaaatccc 169820397
tgtttcacct gaaaaagaat tcagaaggtt agttattaag ctaatcagga 169820447
aggcaccagt gaaaggcaaa gtccaactta aggaaatcaa aaaaatgata 169820497
caacaggtga agggagagat tttcaatgaa atagatagca taaataaaaa 169820547
acaatcaaaa cttcaggaaa caatggacac agttatagaa atgcaaaagg 169820597
ctctggaaac tctcagcaat agaattgaac acgctgaaga aagaacttca 169820647
gagctcaaag acaaggtttt agaatgaacc caatccaaaa aagacaaagg 169820697
aaaaattata agaaaatatg aacaaagcct ccaataagtc tgggattata 169820747
ttaaatggcc aaacctaaga ataattggca ttcctgagga agaagagaaa 169820797
tctaaaagtt tggaaaacat attcgggga ataatcaagg aaaactcccc 169820847
cagccttgct agagccctag acatccaaat acaagaggct caaagaacac 169820897
ctgggaaatt cattgcaaaa agatcattac ttagacacat tgtcatcagg 169820947
ttatctaaag ttaagatgaa ggaaagaatc ttaagagctg tgaggcaaaa 169820997
gcaccaggta atctataaag ggaaacctat cagattaaca gcagatttct 169821047
cagccaaaac cctacaagct agaagggatt ggggccctat cttcagcctc 169821097
cttaaacaaa acaattatca gccaagaatt ttgtagccag tgaaactaag 169821147
ctttataaat gaaggaaaga tacagtcttt ttcagataaa caaatgctga 169821197
gagaattcac cactaccaag tcagcactac aagaactact aaaaggagct 169821247
ctaaaccttc aatcaaatcc tggaaacaca tcaaaacaga acgtctttaa 169821297
ggcataaatc tcacagaaac tataaaacaa aaatacaatt aagacaacaa 169821347
caaaaaacaa ggtatacgga caacaaatag catgaagaat gtaatggtac 169821397
ctcacacctc aatactaaca ttgaatgtaa atggcctaca tgctccactt 169821447
aaaagataca gaattgcaga atggctaaga attcaccaac cagctatctg 169821497
ctgccttcaa gagactcacc taacacataa ggacacaaat aaacttaagg 169821547
taaaggggtg gaaaagacat tctatgcaaa tggagtaact attcttatat 169821597
cagacaaaac aaatttaga gcaacagcag ttaaaaaaga caaagaggga 169821647
cattatataa tgataaaagg ccttgaccaa caagaaaata tcacaatcct 169821697
aaatatatat gcacctaaca ctgaagctcc taaatttata aaacaattac 169821747
taatagacct aagaaatgag atagacggca acacagtaac agaggggac 169821797
ttcaatactc cactgacagc actagacagg tcatcaagac agaaagtcaa 169821847
caaagaacaa tggatttaaa gtatatcctg gaacaaatgg acttaacaga 169821897
tatttataga acattctatc aaacaactgt ggaatataca ttctattcaa 169821947
ctgcatatgg aactttctcc aagatagacc atatgatagg tcacaaaatg 169821997
agccttgata aatttaagaa aattgaaatt atatcaagca ctctgttaga 169822047
ccacagtgga ataaaactgg aaattaaggc caaaaggact ttctaaatca 169822097
tgcaaataca tggaaattaa ataacctgct cctgaatatc actgggtcaa 169822147
aaatgaaatc aaaatgcaaa tttaaaaatt attcaaactg aatgacagta 169822197
ctgacacaac ctatcaaaac ctctgggatc cagcaaaggg gatgctaaga 169822247
ggaaagttca tagccctaaa ggcctacatt gaaaagtctg aaagagcaca 169822297
aatagataat ctaaagtcac acctcaagga actagagaaa caagaacaaa 169822347
ccaaacccaa attcagcaga agaaaggaaa taaccaagat cagagcagaa 169822397
ctaaatgaaa ttgaaacaaa aaaattacaa aagataaatg aaacaaatag 169822447
ctgattcttt gaaaagataa atacgattga tagaccatta gcaagattaa 169822497
ccaagatagg aagagagaaa atccaaataa gctcaattag aaatgaaatg 169822547
ggagacattg caactgaaaa ccacagaaat acaagagaac attcaaggct 169822597
actctgaaca cctttatgtg cataaacttg aaaacctaaa ggagatggat 169822647
aaattcctgg atagatacaa ccctccttgc ttaaatcagg gagaattcga 169822697

FIG. 1.41

```
taccatgaac agaccaataa caagcagtga gattgaaatg gtaattaaaa 169822747
aattaccaat aaaaaagtcc aggaccaggt ggattcatac cagaattcta 169822797
ccagacattc aaagaagaaa tggtaccaat cctactgaca ctattccaca 169822847
agatagagaa agaaggaaac ctccctaaat catcctagga agccagtgtc 169822897
atcctaatac caaaaccagg aaaggacaca accaaaaaag aaaactacag 169822947
accaatatcc ctgatgaaca tagatgcaaa aaatccttaa caaaatgcta 169822997
gctaaccgaa tccaacaaca tatcaaaaag ataatccacc atgatcaagt 169823047
gagtttaata ccagggatgc agggagggtt taacatatgc aaagtcaata 169823097
aatgtgatac accacataaa cataattaaa aacaaaaatc acaggatcat 169823147
ctcaatagat gcagaaaaag cattcaacaa aatccagcac gcttctatga 169823197
ttaaaactct cagcaaaatt ggcacacaag ggacatacct cagtgtaata 169823247
aaagtcatct atgacaaacc cacagcctac ataatactga gaactggaac 169823297
aaagatgccc agtctcacca ctcttcttca acctagtaat ggaagtccta 169823347
gccagagcaa taagacaaga gaaagaaata aaaggcatcc aaatcagtaa 169823397
agaggaagtc aaactgtcac tgtttgctga tgatattatt gtttacctag 169823447
aaaaacctaa agatgcctcc agaaagctcc tagaactgat caaagaattc 169823497
agcaaagttt tgaatacaaa attaatgtac acaaatcagt agctcttcta 169823547
tccaccaact gcaaccaagc tgagaatcaa atcaagaact caacctcttt 169823597
tacaatagct gcaaaaaaaa taaaataaaa tacttaggaa tatacctaac 169823647
caaggagatg aaagacctct acaaggaaga ctacaaaaca ctgctgaaag 169823697
aaatcataga tgacacagac aaatggaaac acatccaatg ctcatgtatg 169823747
ggtagattaa atattgtgaa aatgacaata ctaccaaaag caatctacaa 169823797
attcagtgca attccatcaa aatactacta tcattcttca cagaattaga 169823847
aaaaaacagt cttaaaattc acatggaagc aaaaaagagc ccacatagcc 169823897
aaagcaagac taagcaaaaa gaacaaatct ggaggcatca cattacctga 169823947
tttcaaacta tactataagg ccatagtcac ccaaacagca tggtactggt 169823997
ataaaaatag gcacataggg ttgggtgcag tggctcacac ctgtaatccc 169824047
agcactttgg gagaccgagg caggcggatc acaaagtcag gagattgaga 169824097
ccatcctggc taacatggta aaactccgtc tctactaaaa atacaaaaaa 169824147
ttagccaggt gtggtggcag acgcctgtac tcccagctac tcgggaggct 169824197
gaggcaggag aatggcatga acccgggagg cagagcttgc agtgagctga 169824247
gatagagcca ctgcactcca gcccgggcga caaaacgaga ctccatctca 169824297
aaaaaaaaaa aaggcaaata gaccaatgga acagaagaga gaacgcagaa 169824347
ataaacccga acgcttacag caaactgatc tttgacaaag caaacaaaaa 169824397
catatagtgg ggaaaggaca cctcattcaa ggaatagtgc tgggataatt 169824447
ggcaagccac atgtaggaga atgaaactgg atcctcatct ctcaccttat 169824497
acaaaaatca actcaagatg gatcaagggc ttaaatctaa gacctgaaac 169824547
tataaaaatt ctagaagata acattggaaa acccctteta gacattcgct 169824597
taggcaagga tttcataacc aagaaccaaa agcaaatgca ataaaaacaa 169824647
agataaatag ctgggactta attaaactaa agagcttttg cacagcaaaa 169824697
tgaacagtca gcagagtaaa cagacaaccc agagagtggg agaaaatctt 169824747
cacaatctat acatctgacc aaggactaat atccagaatc tacaacaaac 169824797
tcaaacaaat tagcaaaaaa aaaaaaaaaa aaaaactacc aaaaaaaatc 169824847
atcaaaaatt gggctaagga catgaataga caattctcaa aagaagatat 169824897
acaaatggcc aagaaaaata tgaaaaaatg ttcaacatca ctaatgatca 169824947
gggaaatgaa aatcaaaacc acaatgtgat accacctcac tcttgcaagg 169824997
atggccataa taaaaaaatc aaaaaataat agacactggc atggatgtgg 169825047
tgaacaggga acacttctac actgctggtg aaaatgtaaa actagtacaa 169825097
ccactatgga aaacagtgtg gagattcctt aaagtactaa aagtagaact 169825147
accatttgat ccagcaatcc cactactggg tgtctaccca gaggaaaaga 169825197
agtcattata cgaaaaagat acttgcacac acatatttac agcagcacaa 169825247
ttcgcaattg taaaaacgtg gaaccagccc aaatgcacat aaagcaacga 169825297
```

FIG. 1.42

gtggatatat atatatataa atggaatact actcagccaa aaaaaggaat 169825347
gaattagtgg cattcacagc aacctggatg agattggaga ctattattct 169825397
aagtgaagta actcagcaat ggaaaatcaa tcatcatatg ttctcattca 169825447
taagtgggag ctaaactatg aggatgcaaa ggcataagag tgacacagtg 169825497
gactttgggg actcaggggg agagggtggg gagtggatga gggataaaag 169825547
accacaaata tggtgcagta tatactgctc gggtgatggg tgcaccaaaa 169825597
tctcacaaat caccaccaaa ggactcactc atgtaacaaa acatcacctg 169825647
ttccccaata acctatgaaa ataaaaaaaa taaaaataaa attttaaaac 169825697
taccaaataa caaagaaatt gaatttgtca ttttaaaact tcccacaaag 169825747
aacagcttaa gcccagacag cttcactggt gaattataca gaatatttaa 169825797
attaaagaat taatgtcaat tcttcacaaa gtcttctaaa atgtagaaga 169825847
agaggggaca ttttccattt cattttgtga ggccagtatt atcccattac 169825897
caaaccatac aaagccacta caaagaaaac tacagaccaa tactgcttat 169825947
gaatataaac ataaaaatcc tcaacaaaat actagtaaac tgaatccagc 169825997
agtctgttaa aaagactaac accatgacca aataggattt atcaaaggaa 169826047
tgcaaagttg gtttaacatt tgaaaattaa ttaatataat acataattca 169826097
atagaaaaga gaaaaaaaca catgatcatc ttattagaca cagaaaaatc 169826147
atttaacaaa atccaaactg acgtcatgat aaaaacactc aacaaactag 169826197
aaatagagtg gaactttctc aatgtgataa aggacatcta ccaaaaatcc 169826247
acagctaata tgataaataa tggtaaaaga ctgaatgttt ttcctctaag 169826297
atcaggaaaa atacaaggat gtctgctctc agcactttta ttaaatattg 169826347
tactggaagt tctagccaga acaattaggc aaggaaatga aataaaatga 169826397
actcaaattg gaaaggaaga aataaaacta tttccggatg ataccacctt 169826447
atatagagac aatcctaaat aatccattat tagaattatc agaactaatt 169826497
aacaagatca gcaaggttac aggatataaa attaaaattc ctatacacta 169826547
gtaatgaata atccaaaaat aaaattcaaa aaacaatccc acttacaata 169826597
gcatcaagaa aataaaatcc ttatgaataa atttaacaga agtctaaaac 169826647
ttatatatac tctaaacacg acaaaatatc attgaaataa attaaagatg 169826697
gaaataaatg caaagacatc catgttcatg atcagaagac ttatattgtt 169826747
aagatggcaa tacttaatat tataaagtga tttacaaatt gatttatagg 169826797
ttcaaagtga ttcgatgcaa tctctgtcaa agtttcatag catttttgc 169826847
agttatttat actgcaaagt gatttacaga tttaatgcaa cccgtgtcaa 169826897
aatcccatgg ccatttttgc agaaatggaa aagctattgc tggaattcat 169826947
atggattgca agtgacccca aatagccaaa acaatcctga taaagaacaa 169826997
agctagacaa agtccatctt gcacttcctg atttcgaatc ttacttcaaa 169827047
gctatggcag tgaaaacatt gaactgagta cggtaatatt tatcatctca 169827097
aaacctcaca acaatgcagt caagtggaac cactgtctca gtatttcaga 169827147
tgcagagccc aggctcaaag aaatatgggg aattgcttga ggtcagagag 169827197
ctgggtaacc acaaatgcgg gtccacattc agatctgccc taagtataaa 169827247
gacattgcat cctctcagcc actacctaca ccactcttga gtttcttcga 169827297
cacaggacct gtgaacagac agcccaagac gcttgggaat catggaattc 169827347
taaccccc aa agcctggctt agggacctca tccagcgacc agacagggcg 169827397
tgttgtgcct catccacatt tctgaaagtg tccactcagt ggacagcctg 169827447
ctttctagtc tctgccctac tggcttgagt gtggatgccc agacggttag 169827497
gaggcaagct ccagagctcc catatgatca cttccactgt cacctgtgtg 169827547
ccacaagtgc tctctgtaca catgctccac ctgttctgat gatctttcag 169827597
tctttcaact tccaagccat gtgagggatc cttcaggaac atgagcactg 169827647
ggacatgctg gacgctggag agagatgcag acacccagag ctggctgagc 169827697
taacatgcta cagtttgtga ggaggagaca caaaatttca tacagatgat 169827747
aaaatttttc tgtacaacaa acctttgcta tagatcctac aatatatcca 169827797
ttattctcac tagaatgtga acatgattct gcaaattcct agggagaaaa 169827847
cccagcctgc cccttatcag aggctataaa ccacctgttt ttctttccat 169827897

FIG. 1.43

cctccttccc ttgcttccct ctcacacatc agtcctttag agaaaactga 169827947
gcttttccaa gctgttattg ctcaaagaaa tgtcttcatc caagggaacc 169827997
aagggatgtg aagggcactg gcctccgaag catttgccat tgtcaacttt 169828047
tattgagcac ctactatgta ccaagtactg tgctaggttc tgacgacact 169828097
gaagaaacaa aaaaatagat acttcctaat ctcaagggac agtccactgg 169828147
tggagtcaga ccttcatcac gcacacacac aaacacaaag agagagacag 169828197
aaagagagag agagagagtg agagagaaat acatgtattc agatactgct 169828247
ctgaacctta tctgggtccg gagggcagag aaggcttctt gaactaggac 169828297
ctaagaaatg ggaagaaatt tgctagttaa gcaggtgttg ggggaaggtc 169828347
ctcagaagaa cattctagaa caagtgcaag gtcccaagag ggagggagat 169828397
ggtccattcc tgcaactgaa agaagaccaa tgtttctgaa ccacatggag 169828447
caggaggaag cagcaggaga atccaacagg gggagggtca gaaagcccat 169828497
gtttgtaact aaccggaacg atgaatgtgg tttggaagac aagtgagagg 169828547
atgtgtacca cgggccagat gtgggagacc aaggagggga ctagtgcatt 169828597
tttccagtaa agaaataata gtgcttgggg ctagggaggc tcaaattgag 169828647
aagaagacaa gtggggaggt ttaagagaga tttctaaatt aaaatgtaca 169828697
gggaatagtg acagatgatg catggggtag agagagagaa ggcaatgtca 169828747
agagtgactc ccaaatctgg cttgcaaaca gaatgaacgg tggtgtcatt 169828797
cactgagaaa ggacacccaa gaggaggatg tgattagcag gggagagagc 169828847
aggagttcaa gctgatatgt agatccacat taatatgtct agtcagaatg 169828897
tggatacgta ggtttggggc ttagaagaaa ggtctggggt gaagatctaa 169828947
ccctagcagt catctgcaaa gagatggtaa taaaataaat acaattttta 169828997
aatggatgga atttccaggg aaaaagcaga gggtgaaatg agtaaaggat 169829047
ctagggccaa ggctaaaaga aatccattat tagaaacaga aaaggtgtct 169829097
tagtgcattc aggctgctat aacaaagtac catagcctga gtggcttata 169829147
aaccacagaa attcatttct cacagttctg gaggctggga agtctaggat 169829197
caaggtgcaa gtgagagtct gccttctggc tcatagatgc tgccttctgg 169829247
ctatgttctc acatggtaga ggatgtacgg aagctctctg cgacttcatt 169829297
tatgaggacg ctaatcccat tcatgaagac tccaccctca tgacttaatc 169829347
acctccccaa atccccacct cctagtacca tcaccttgag ggttaagatt 169829397
tcagtatatg aactttaggg gtcacaagta ttcagtctat agcaggagga 169829447
atagccaaga aggatgaatg aaaatcatac aaggatgatt tcatggaagg 169829497
caagggagta caatgtctca aataaaccaa gtcctgagtc aaacattact 169829547
gagaatgtga gtgtaataaa accgagactc aaaagtaggc attggatgtg 169829597
atgacatgac tatcactggt taccttaggg agagaagttt tggcggagtt 169829647
gacaagcaca gtcagatgga atgtgctggc ggatggcaaa gatggggaaa 169829697
tgaagatacc cagtgtagac agcttctgaa agcagctggc cgtgagtcag 169829747
aggtagacag gaaagtgact aatacagtgc agaggtcgac gtttttagct 169829797
ttattgtatt taagagagag acctgagcac atttaaaatg ctgatgtgac 169829847
attgtccaag ctgagaggaa acaattagat ctatatgaga gaaaagaatg 169829897
atgaatatca ggcaagtatg gcaaagacca ccattacttt tgcaccaacc 169829947
caataagaaa gttggaggat cttcacaaaa caaaggtggt tttggcctga 169829997
gtggggagga ggaacagctt ctttactacc agtggaaaga aggagaggct 169830047
ggtgcagggg cagggaggta gcagggagca gagggaggcc ccatccacgc 169830097
tcaggttctt agaatgagga agatgacatt ggcaggacca taggtgagca 169830147
tcttctaacc caaggaagat ttagaactaa gtataggctg ggcgcggtgg 169830197
ctcacgcctg taatcccagg gcttcgagag gccgaggcgg gtggatcacc 169830247
tgaggtcagg agttagagac cagcctgatc aacatggcaa aaacccatct 169830297
ctactaaaaa tacaaaaatt agccaggtgt gttggcgcct gtctgtagtc 169830347
ccagctactc aggaggctga ggcaggagaa tcgcttgaac ccaggaggtg 169830397
gaggttgcag tgagctgaga tcacgccatt gcactccagc ctgggcaaca 169830447
aagtcagatt ccatctcaaa aaaaaaaaaa aaaaaaaaag gaaactaagt 169830497

FIG. 1.44

atagaagtat ggaatagaac tatattcttt ctattaagat atttgtgctt 169830547
tgaaataagc tatgtttaca cacttgtaat gtttaagaat ctgtggcctt 169830597
tcagagtcat atatgaactt ttccttctaa tataaaatgt ttaacggagc 169830647
aattgacttt gacatcagat tctaagttga aatcttactg tatttaaata 169830697
agatttggaa cctgtaaaag aatttaagcc ttgccgtctt tagaagttta 169830747
atgaattaga tttataacaa ttacttaaat atctgagaag gtttgttaga 169830797
caattgaagt acttaaaaag gaattaaaat atattaagcc tataaatgca 169830847
gtttacaatg tttagagcaa tttaattaaa aacatttgta aatgagacga 169830897
aacatttctc aaaggtactc ttaaatgtga ttgttaaaat ttgctagacc 169830947
tataaataaa taataagatt cgtaagctga atttcaaagc ttatggagga 169830997
acttgggtcc atatgaattt gttactttaa taaattgaat gttaatttg 169831047
aaaaacaaag aaacctttca tcaatatttt tggcgcctaa gagctgctct 169831097
tgagggcatc taattaatag ttttttttatt atttaaaaaa tatcattagg 169831147
ccaggtgcag tggctctctc ctgtaatctc agcactttgg gaggccgagg 169831197
tgggtggata gcttgagccc aggagtttga ggccagcctg ggcaacatgg 169831247
agaaacctta tctctactaa aaaaaaaacc acacaaaaat tagctggatg 169831297
tggtggcaca ccgctactta ggagactgag atgggaggat cacctgagcc 169831347
caggaggtgg agggtgcagt gagccgagat cgcgcccccta ccctccagcc 169831397
tggaagacac agtgagaccc tgtctcaaac aaaatttttt taatggctat 169831447
aatgaaaaaa aaaaatcaac cagtatgtaa ggaaaaagct gaagcccttt 169831497
gccccatttc ccagaggtaa ccatcattac aagttccttg tgtttctgcc 169831547
cagaaatgtt atttgcataa gcatagaatc tctccccagc cccattttta 169831597
aacaaagaga tatattctgc atctaacatt ctgtactgct tttgtgctta 169831647
acaagataac ttgagccggg tgtggtggtt catgcctgta atcctcaagc 169831697
tttgggagct gagacaagag gattccttga ggccagaagt tcaagatcag 169831747
cctgggcaac atagtgagac ccgatctgca aaaaaacatg taaaattagc 169831797
tgagcatggt ggtgtacacc tgtagtccca gctatttagg aggatgaagc 169831847
aggaggatca cttgagccca ggaattcaag gctatagtga accatgatca 169831897
cgccctgcac tcctgcctgg gcaacagagg gagaccctgc ctcaaaacaa 169831947
acaaacaaac aaaaaacaat atatcttaaa aacatgttca tgtttcccat 169831997
aagaataaag attaacatcc ctctctccct tcctcatcgc ctttggggtg 169832047
tggcctcatg cctcccctct gggttgtgcc caaacttctc tcaagagtgg 169832097
atcctctcac tgtctctact tcctgcctcc ccagctactg actgtaccaa 169832147
gactgtgctt tctgagggca ccaatgccct ccaccttacc aaacccgcta 169832197
gaggcttctc agttctcata tctcttactc tccggctttc aacacgtgag 169832247
ccatcttttc cttgctgcat tgcaaagcca cctttatcta gcaatgaatt 169832297
cccatttgta tctgggtcta tttctggcct ttccattctc ttccattgat 169832347
ctctctgtcc ttgggtgcaa gttttctgat gacctgactt gattcatgga 169832397
taaaacctat actcttgcag aatgaatgtc cttcactcaa tcctccataa 169832447
ataacaattc tttcaataga gcttttctct ctttcttaat aagagatagg 169832497
gacagcagag gttcacgtat ttcctggcaa ggcccagaat gccgttattc 169832547
ttgattgagg gcagagttat cagccaggca gatagtggaa ttgatatccc 169832597
tgtgtgaaaa tggaagagcc aatctgagct gtcgccccat tcctacagaa 169832647
ctagctgccc gtctttgaat tcccagtgct cattcaggcc tctgcacttt 169832697
cacttgagca catctggccc ccactttctc ctttcctcct ctcttctact 169832747
aaatagtaaa agagctcttc ttcacatctc agctcaggtg tccccttgcc 169832797
caggaaacct ttcctgaggc tcctccctat gccccacatt agccactctg 169832847
ggcttccctc tgccccagcc cttaacacaa cagaatcaac atgcctgtaa 169832897
cagaattgcc ctatgccccc tctcccctag accaccgtga gctccccaag 169832947
ggcaggacct gtctctcagc agacttttac tcttgttacc gaactgatct 169832997
tgggtctgcc cacccggcac agtgcagcca aacactgata ttgggattgc 169833047
agccagagaa agtgaggcat ttattgcagg gcgccaagca agcagaattg 169833097

FIG. 1.45

ggcagctcat gcttaagatc agaactccct gatggcttac aggtaagggt 169833147
ttttaaaggt agagggggag aggttacagg caaaatcata aattaataca 169833197
tggagactat gtgttggttt ggcctaaaaa ggcaaagcat cttgaagcgg 169833247
aagtttggga gtgtggcaag tgaaaggtgg attcaaagat tttcagtgt 169833297
tgtgatgggt taaggaggtg aagttttgtc taaaattttg gtgtaggcag 169833347
aaaagaacgt tagctcttgc ccgtgggcat gatctcttcc aggtccctca 169833397
gcaagaaact taggagaaag catggtggtt ggagttcggt cctcagcttc 169833447
cccttatcca aggtctctgt gcctgcagat ggcactttcc atttggtgga 169833497
ggtctgggtt tctgaaacac aactcaggga cgtaggttga gatgttatct 169833547
ttagtttcta caggaaacca aatatcctat gactctaatt tccttggcta 169833597
ttgtcttaag ctactattac cttcttgctt gtcaagttgc gcatttactt 169833647
ttcaaggctt gctacgtgcc tggaatttct agattttcct ttatttccat 169833697
gcttggggag aggagtgcct ggcaggctcc taagaggggt ctgtgctcca 169833747
tctcgccccc tatcttgaac tatcggttgg gtgctctaga atctgtatgg 169833797
ggtggaagtg ttcattcatt ttctgtacaa aagcaatcaa tgcttattgt 169833847
ggaaaaccca aataagagag ttgctctaaa caacaccctc cccagtccca 169833897
ataccttgtc cagaagaaac cactgtttgg tgagtatatt agtcaatgtc 169833947
tgcagaccag atcggatgac caagttttcc ataaatggat ggccatccac 169833997
ttcccttcaa gggcgagggt agtttgttct gatccatctc ccttttcaca 169834047
gctcagggag ggaggaagac ccaggaagga gagctgccac agttactagt 169834097
ggcccagctg ggatttaaag tccgccgtga ctgaagcttg gctccacatg 169834147
ccagtctgca aggccctgag tgccctcagc agtaattcca agcaaagcag 169834197
ggaagcagcg ggccaggtgc tgaactgaac tgctgctcag ggctcctgag 169834247
cctccccctg cctcctccct ctcttctcca ccctggggcc tctctctctg 169834297
tccctacttc ctcctttaga tcctctttcc cctgaaccca ctcatttatc 169834347
accttttgat gagttccacc aggcagacca tgtcaggaaa tttcttggtg 169834397
ttcattttaa taaaacttaa ttattaagac agcctcacaa gtcatgatac 169834447
atttactggt tcatttttca catctccgtc agaggcctcc tggcagccac 169834497
gtgggaggca tgaaggctat ggggtggaag tgtcagagcc ttttctggcc 169834547
tcctgcagga gctgggtttg gggaagcagt tcctgaccct tcctctgccg 169834597
gcccaccccc gttattctcc agacgctgag gatgggatgg aatgagcacc 169834647
aaacatggag tcaggagacc tgggactcaa tcctcctcct gctgcagact 169834697
atgctcagac cctgctgaag gaaggcatcc tctctgggcc tcagctgtct 169834747
catgtacaag atgggaatca tctcagtcca aaccagacag agccactgtg 169834797
agattcagaa gaaagctctc gcaatgagag gcctccccag gcagatggag 169834847
gcaaaactgc aagggtggat tgacgctggg gcggcgcctg ccccacagtc 169834897
ctgtaggtcc gcccgcctgg gtaagggatg gggtgaaatt gggggtctct 169834947
gatgatcaca gtaataactg actttttaaa aaattttatt tttccatagg 169834997
ttattggtgt acaggtggtg tttggttaca tgagtaagtt ctttagtggt 169835047
gatttgtgag attttggtgc acccatcacc caagcagtat acactgcact 169835097
ccatttgcaa tcttttatcc ctcgcccccc tcccaccctc ccccccaagt 169835147
ccccaaagtc cattgtatca gttttatgcc tttgcgtcct catagcttag 169835197
ctcccacaca tcagtgagaa catacgacgt ttggttttcc attcctgagt 169835247
tacttcactt agaataatag tctccaatct catccaggtc actacaaatg 169835297
ctgataattc attccttttt atagctgagt agtattccat tgtatctaca 169835347
tataccacag tttctttatc cactcgttga ttgatggaca tttgggtcgg 169835397
ttccacgatt ttgcaattgc gaattgtgct gctataaaca tgtgtgtgca 169835447
agtatctttt tcatataaag acttcttttc ctctgggtag atacccagta 169835497
gtgggattgc tggatcaaat ggtagttcta cctctagtac tttaaggaat 169835547
ctccacactg ttttccatcg tggctgttct agctgacatt ccaacgagca 169835597
gtgtagaagt gttccctgtt cactgcatcc acacctacat ctactgtttt 169835647
ttgatttttt attatggcca ttcttacagg agtgaggtgg tgtcgcattg 169835697

FIG. 1.46

```
tggttttgat ttgcatttcc cttatcatta gtgatgttga gcatttttc  169835747
atatgtttct tagccatttg tatatctttt tctgagaatt gtttataatt  169835797
gacatttatt aagtgctttg cagacgctgt gccaaggatg tcatgttgtc  169835847
atatgtatta gctggctaaa tctcacagtt gctgtacttg ttactaatat  169835897
tgtaaaatgt gtaccagtgt tatgcccatt ttatagttga gaaaactgag  169835947
gcatagggag gcaaaagcaa cgtgccccgaa gttacaaagc cagtcaatgg  169835997
tggaaccaga attagaactc tggccaactc cagagtctac cttcttacca  169836047
ataaagtcat cacccctgag aaatcaggga ggggccagga gtttttaata  169836097
atcaaagcaa cctcacaccg aagtctaagg gaaagcagag gttcggctga  169836147
gcaccagggc ccctggcagc tcagcatggg ggccgtcagt gacacctgca  169836197
ctcatgatat cccacacctg tggtcttcca aggggacaga ctgaactctt  169836247
gccacttcat ccacaaagcc cccctctatt tcctcctttc cctcgactgc  169836297
acttccttga taacagaccc aattttgttc agcaattcac ccccagggaa  169836347
gctgacccac aaatcccatg atgccaacag ggtcccagta tctttgccag  169836397
ttctctgacc cagcctcaca ccagggtgtg gcatgagcaa cgagacaggg  169836447
tagtgttggt gcaggtgaca cagggctagg atatggcaca ggaatttaga  169836497
aaataattag actgcgttgg gcgtcaggac acaccactcc aaaatatgac  169836547
tgtaggcgac caggaatctg ccacagcaaa atctactttg gcatttttca  169836597
agctagttat tatgagaaac tgcagacaca ggagtagctc tgaaaagctg  169836647
tcctttttgta aaagaaattt acatctataa aggaaatcca cattagtaaa  169836697
acaatctgta tcaggaagag ggctgctcag agacagcttc tattacccga  169836747
gaggcttttt atctttataa cgagacaacc tttacttatc atacatttcc  169836797
tccccttacc ctccaagaac tccaccatct ccgagaaacc caaagcaccc  169836847
ctattccttt ctgtagctca ggatgctaca ttagcttcaa tcatctggcc  169836897
ctactttgag tctcatgtat tgtgggaacc cccgcccccc atacctatgc  169836947
aagtaattat aaatgttttt gcttctgcta atctgtctta tgtaaattta  169836997
atttatagct cagtcaaaga acctagaagt gtgggggtta accaccgttc  169837047
cctcccctgc aagaggattg gtctatgaga gaagtcagct tccatttatc  169837097
gagcacctag taagcaccag gccccagacc ttaagcttta catgtgttat  169837147
ttctgattcc catagactcc tctagcttca gtggtattac ttgcattttg  169837197
ctgatgaata aacggaggtt cagagagggt aagtgacttg tccaaggtca  169837247
cacaaccagg aaacagcaat gctgcgagtg gaacccaggt gttgtgtccg  169837297
tgggtctgtg gtctcgctga cttcaagaat gaagccacca gaccttcacg  169837347
gggagtgtga cagccctcaa aggtggcaag gacccaaaga gtgagcagca  169837397
gcaagatttt ttgtgaagag caacagaaca aaccccccac cgcgtagaag  169837447
gggaccccac tgggttgccg ccgctggtca gggtagccag cttttatttc  169837497
cttatttgtc cctgcccatg tcctgctgat tggtccattt tacagagtgc  169837547
caattggtcc attttacaaa gtgctgattg gtccacttta cagagtgctg  169837597
attggtctat tttacaaacc tctagctagc tacagagtgc tgattggtgc  169837647
attttgacag agcactgatt ggtacatttc acaaacctct agctagctac  169837697
agagtgctga ttggtgcatt ttacaatccc cttgtaagac agaaaagttc  169837747
ttcaagtccc cacccgaccc agaagtccag ctggcttcac ctctcagtgt  169837797
gaccaacctc caagcttttt tatttcattg cttggcttcc ctctctacca  169837847
tgtccatttc tgcacattta tttcagcctc acattgacca gctcctgcgt  169837897
gccaggcatg gcctaagtgt tattcgaaca aagcttcgga agctagtcca  169837947
cttgcttctg tctagaagag gagggcggtg ctgggaggaa cctccctgac  169837997
tcctgctgca gacccactga gaggtgactc ccacacggct gtcctggaac  169838047
aagacagcag cttttcttag gttgttctaa gttaagggct ctcactgctg  169838097
gtaagacagg gaaatagagg agataaaaat aacaaaacaa aaggagaagt  169838147
cacaaagtta caggaaatct caatatatct ttctgttctg gatgctgctc  169838197
caaacacaac tgcagcaggg cctctttgtg gggggttctt atttgagagc  169838247
cacaaaggac ctcaaagcca aaacagactg attatctagc ccacctccat  169838297
```

FIG. 1.47

gtcctcccct ccttccccct acttccttac taacagaccc aattttgttc 169838347
aggaatccac cccctgccga gaagaaactg atcctattcc cagctcagag 169838397
ccaaatcctg aatcatccaa tattaccccc ttgtcaggag taggttgagg 169838447
ggtgacaagt ggcccatgct tttctgggg tcagggagaa gaaatgatta 169838497
ttagaacaat tttggtttaa actttttttt ttttttgaa acagggtctc 169838547
actctgtcac ccaggctgga atgcagtggt gcgatctcag ctcactgcag 169838597
cctcaacctc tgcagcctca agtgattctc ccacctcagc ctcctgacta 169838647
gctgtgacta caggcctgtg ccaccatgcc tcgctaattt ttgtattttt 169838697
tgtagagaca gtgttttgcc atgttgccca ggatggtctt tcacttctga 169838747
gctcaagcaa tccatcagcc ttggcctccc aaagtgctgg gattacaggc 169838797
atgagctact gcacccagcc taaacttgtt tctaattagc agttccaaat 169838847
ttttagatgc tcatatctct gactaattac aataacagat gatgaaatat 169838897
cgaagtgttg aactgtcctc tcaattccag ccggaacaaa cagattctgt 169838947
tttctctaca ttttgactga actgtcttgg tgtcatacat tagatggtaa 169838997
acttctcctc tgttccaatc tccccttct tcatggctaa ttagttaaaa 169839047
gcacactgtt gataaacaca atatgaatag aaaaattttt gtttagcctt 169839097
aaaaaatagc agtatgacaa tttgtcttga attttgacct ttcagtggtg 169839147
gcttgtatca aagttacggt cttgggatag tgctatgacc cgctgaaatg 169839197
gctgcgggcc tgaaattttg atcgtaaggc aaattttggt acagaaaatc 169839247
gcctgtttct gctgacttct gctttagaca tccactctta aggaaaagca 169839297
ttgttatccc accagctaac acatcactct ctaccatata tcaaagagtc 169839347
tcaagatcct tctattcatg aaaaatgaaa atattctcac cacatcctcg 169839397
cagtaatgtt caacataaat taccaagcac agagacagtt tgggaatgta 169839447
cattataaat ggccttccct acaagactaa gagtgaatcc taatgtaaac 169839497
tatagacttt gggtggtaat aatgtgttaa tgtcggttga cagattgtaa 169839547
taaatgcacc gctgtaatgt ggaatgttga agtgagggaa gctgtaagtg 169839597
tatggagaca gataaatggg aattctctgt actttctgct caattttact 169839647
gtgaacctaa gactgctcaa aaaagtagaa gtaagtaaat acataagtca 169839697
gtaaataaat ggcctttttct tgggctgaga aatgaagaca tttcctatat 169839747
gttacttgga cctgtaaatt cactctgggg agatatatat atatatcaga 169839797
aagtatatgt tacttggacc tgtaaattca ctctggggat gtgtgtgtat 169839847
atatatatac acatatatat tacatatata tatatacaca tatatattag 169839897
aaagtaaata tttcttgtta aaatctgaga tataactgcc ctctaaaggt 169839947
gtttatttcc tgggttggct tttttgtttt gttttgtttt gtttatttgt 169839997
ttttgaggca gagtctcgtt ctgtagccca ggctggagtg cggtggcaca 169840047
gtctccactc actgcaacct ccacctcctg ggtcccagtt caagcaattc 169840097
tcctgcctca gcctcccaag tagctgggat tacaggcaca tgccaccatg 169840147
ctcagctaat ttttgtattt tttagtagag acacagtttc accgtgtggg 169840197
ccaggctggt cttgaactcc tgaccttgtg atctgcctgc ctcggcctcc 169840247
caaagtgctg ggattagagg tgtgagtgaa agcacctggc cgggttggct 169840297
cttatctatt tacttgatag ccaggtttgg agtcattagt ggctgttgct 169840347
tactccttga acaaacattt ttgagtgttg tgctgtacag gccactggat 169840397
agatagcgat gaatcccaca cagtcctgtc ctcagagccc acatcttcat 169840447
agatctataa attaatattt gcagtagagt atgacaaaaa aactccaata 169840497
gaagtgcctc cagggaagat ggtaccaatt gaactggttg ctggggaggt 169840547
gtcaggggag ggttcatggc agaagcctca ttgaaggatc tcagaatttc 169840597
atgcctcctg ggaggttcag tccaagacac ctacctccat ctttcagtgc 169840647
agagggcaca tgaggggacc tgccaagatg aagccagaga ggcaacagtg 169840697
gtcaaatgat agaaggcctg gggcgggaag gggcaggtaa agatttgggg 169840747
ctttatccaa atggacttta ttgtagttgt attcatttga taccttttgt 169840797
aagttccttg tttagttatt acatgattat cataaagttt gggagcataa 169840847
tggttagaaa gatatcacag acttaggaaa aggatgcatg ttcctttaat 169840897

FIG. 1.48

```
ttggctcttt taatggactg agagactatg caacgctcat ggctggagga 169840947
caagcttccc cggccttcca gtcccataag gacacctgct gttaatggca 169840997
gtcctgatgg agtgtagatc cctcgggctg ccatcctcac aaaggtgtgt 169841047
tactttctgg ctggcagctc cagatggccc tagggactct gaactcagcc 169841097
tgtgtccgaa ggcttactgc aagactgtgc gactccacca tggtcagttt 169841147
ccccggggaa ccatctctct accaagccca gttttccatt gcaagaacaa 169841197
ttgccaagat gtctaagttt ctatgtgaga attttggcat cttgggttcc 169841247
ttttaaatag gacacacttg tatgctctaa agaaaaaaag aaaaggtttc 169841297
tcatgaagca ttagctttca agattacagt tcggtaggat gttcaagatg 169841347
cttagggtga ataaaaatga cagacagctg aacacttcct ataaatgaaa 169841397
caccaatata gatctaagtt tcatgcatga ctctcaatgt ggttaatgaa 169841447
aaggaagata aaaaaaaaaa aggttggcca tatttgcagg gcatttgctc 169841497
ccaaatgttt caatcctgtt ttctttagac tttgaaaagg gggattgcac 169841547
gttatctgtc aagaaggcat caaagcagag aaatccacaa atgtgtagtg 169841597
tcagatagaa ttcaagcctt cagaaaggac tccactcctt tggttactaa 169841647
gagaactagg ggcttgtatt tctaagatgt cactagctgg aggcgctgag 169841697
caggtaatgg tctatgtttt cctagactat aaaatcctga ttatatggtt 169841747
taataaaata agaatctcag agttctgatg gaaaacaagt aaacttcagg 169841797
tcttagcagg cactagcaga aagcaccaga gaaaactggg ggagaggtta 169841847
ggactcctgt cccaaagatc cccctcaatt atcctgccat gttatcagtt 169841897
ccctctttac atgttaccaa acatgactac taatttctat ttttttccaa 169841947
gactattaga tgtattcaaa attcactctt cttacaagga tagagaaaag 169841997
tgcctatcga tgcttaataa cccaacatat atttaataga agaattaaat 169842047
caccttctgc aaaggaccaa gaaaagctcc atttgatcaa ttcctttaag 169842097
acatgaagac ttctcctttt ctaagaatcg ccatagtaaa atgcaagctc 169842147
agcatgacat accccaagga aaaatgtatc tgtcccttct gcttttacta 169842197
cagttccata agggtaatac cgagttgttt tgcccacatg gggctctgg 169842247
aatcttggct gtgatgcatt ggtaggatat ttgtcaccaa aactgactca 169842297
gcaatcagtt aaatattaaa caaagcactg attagtgttc ctgattcata 169842347
tttgtgcttt gtttaacatt taacttccga attttataca tctattaaac 169842397
aatattcctc ttgacattcg aacactatct gcacaattaa taaatcaaaa 169842447
acttattaaa aattgaaaca attaaaaatt cccaaactta taaaccattg 169842497
tttacaaaat tatttaacca cactctccaa cacttttaaa taaaaccata 169842547
agtttaatat gtcagaccct tttaaatgtt tcaaacacct aaaaagtcag 169842597
caaaaatgca cacaaaacgt catactgatt gaaaaatata tatgcacact 169842647
tacctttaca ctggttacaa aggcatgaag attatgggta tatattggtt 169842697
ttaaaaagta cttttatact tattcttata ttttctctgt tactttctta 169842747
gagtcaatgc gatcgtttcc taggattaga gtatgaagtg atacagtttc 169842797
tcctaagaat acaaatttct ttcagaacca aaagaaaaat aatctcaggc 169842847
cagccagctc tggggttact gattcttatt tgaaactgat aaagtgtctc 169842897
ccaacattat tgcacttgag cttaaatgtg gcctaagaat ataaaagtcc 169842947
gtgccttcac attggtatcc ttttctgaga ccagagtgtt tcctaaagtg 169842997
cgcttcatct cctaggagac tagggatttt tttttttttt ttttgagaca 169843047
aagtctcgct ctatcaccca ggctagagtg cagtgttgtg atctcggctc 169843097
actgcagcct ctgcctcctg ggttcaagag attctcatgc caccacgcct 169843147
ggttaatttt ttgtattttt tgtatttgag atggggtctc tccatatttc 169843197
acaggctggt ctcaaactcc caggatcaag tgatccaccc acctcaacct 169843247
cccaaactgc tgggattaca ggcgtgaggc actgcacccg gccaagacga 169843297
ggaatttaaa ccctgcagtt tgctgtcctt acgagcacat ttggccaatt 169843347
atccttccat gttatcagtt ccctctttac atgttaccaa gcatgactac 169843397
taatttctat ttttttccag gactattagt tgtattcaaa attcactctt 169843447
tccttcttac aaggatagag aaaagtgcct atcgatgctt aataacccaa 169843497
```

FIG. 1.49

```
catatattta atagaagaaa taatatcacc catatataaa tctgccatta 169843547
aaaataatat gaaataaaac cctatcgcat ttgccattta catcaacttt 169843597
tctcttcata gcttcattag gaacttacag ctcttcacag actccatgtg 169843647
ttttaattga ttatagccat caatcttatt tgatattcaa aatctcagag 169843697
cttgaccaga ggaaacctct ttaatctagc ttcttagtcc ttccagaacc 169843747
accctgtgat attctagaaa gcatccttgc tttctggtta caaaagaaac 169843797
ttccaggctt aaaccatttg ttttacccta ctcaggacaa cccttccaaa 169843847
gagcccctgt ttctttaagt ggagaaaact gttagagaca aagtctggcc 169843897
atttaggggt acaggagagt tgtggtgggc attagtacta ctcctgctgc 169843947
tgctgctgct gctgctgctg tgtccactgt tagtgacaga agtgggaaaa 169843997
tatttaagtt gagttcacat tagtgttccc agtttagcgt gagcattgct 169844047
ccattatgtt gttctaatgt aaaaatgtca aacacatttt tctcaatgag 169844097
atacttaaca ttttaacccct tcatccaagc tatatgttac acctcacttt 169844147
tctatagttg tatatttaga aaataaatat ttatgaaata cttgatattt 169844197
ctcatcaatc cttggtcact caattgaagg gtgtagaagt aaggtcaggt 169844247
tcaccttagt gaggggcctg catctaacct tatctgaagg ggcttatgaa 169844297
tttgggattt attaccttga cagaaagaaa tattgagaat gaccccaccc 169844347
atgctttata gcaatcgctc tttatagttt atttcatagt gacaagaagg 169844397
aactcatcca tggtgggttt ttccctgagt ggtctgtatg gtcatatcag 169844447
aactgaaatc atcccttctt gcttctgagc cccgtttcc aagtcttgtt 169844497
ctttgtttct gtaggtagta aagtgaattc tttaaatccc tgccctccat 169844547
cagctgctaa agcattctgc ttccctctga taagattaac agaatgttgg 169844597
ctgtggttac gggatgcttt gcagtctatg tcttaaacca agccagccat 169844647
gttagcattt cctctagtgg tggtgtttta ggccaattga gaatgtgggt 169844697
gatattaata ttttccaacc agctgataac aggaaagaca cttctgcttg 169844747
gagtccactt tgagaagaga tttattattt aggcagcaca ggacacctcc 169844797
attaatcttc ccccagcagt gcccatctac catcaagttc atatactttc 169844847
cccagggttc aaagaagggt ataattttag ccagcgatta gtcaatattt 169844897
atcaataaga ataataacag taaaattaca atggccaatg tttgaatccc 169844947
taatgtgtgc caggcacagt acggggcctt ttgcagctat tatatcataa 169844997
aacccttaca acagccccat gaaatttgca ccatgatttg cttcatttta 169845047
cttttgggga aaccacggat caagtaactg aagtgatttc tctaggactc 169845097
acagatgagc ggtggcagag cctggaatta gatatatctg atgttagtgt 169845147
tttgaggaat cactctcccc aaaagccata gctcccagac attcttatgt 169845197
aatttgtctt tgctgaggct tgggtattga tgatttaaaa gtccccagag 169845247
accagatttc atctggtatg ctgtgggagt caagtaacgt ccaaggccaa 169845297
gcctgtctga gagaggtttt tattagctcc aaaattataa taacttccac 169845347
agccttcttc caccaattct gccttccact gaaacagcgc tggtgatgtt 169845397
tagaggtatg agtttgggac aattatcagg agaagcattt tggtgctatt 169845447
gtcccacccc ttctgtcctg agaggtttta tctggtcttt cagtatttca 169845497
aataggtcat gactagattc catgcatccc tagaaaacat agcctaaatt 169845547
ttaaattaaa gtatgaggtg gaagaaacag cctttcttcc cttttgtttc 169845597
caaggacaga tggagtcaaa agtggaactg gggcccgcag agccggatag 169845647
cttgggcagt acgtgtgtgc acctgcaggc tgtggagaca ggtatttcca 169845697
tggagctcac tcgccctgcc tctcatccag gcctgaaaat cataggtaac 169845747
tatgaggcaa gaggaaccca gggtggtggg aacaccctag ggtgatccca 169845797
ggctggggac ctttggacta aaaagatgaa agccaacatt ccctccccag 169845847
gaggagatgc aactcctgca ctctctagtg accatcactg ggatattgca 169845897
cagatctgca gtcaccttct aaatcccctt aaagtggacc tagccatcct 169845947
ctccatttta agaccacatc tcctgtctgc tacagcccct ctcgcttctt 169845997
tttctttaag gatatctggc tggttgtatt gggttaacat gcaagaagag 169846047
agtaccaatc actccataac ttgggtaatg catgtcaatg gtgatctgtg 169846097
```

FIG. 1.50

```
tggggccgca aggttccaga tggttgggac aactctacaa tcagtcacat  169846147
ttgggttggt taaatccccc actcatcttt acagctgtat cctgcaagtt  169846197
agtggctgcc tgtctctgaa cttcaccttc cttatggttg tcaaaaatac  169846247
ctccatggga taaaaacgca gcatctgtag attcccaaat aggtgcaagt  169846297
agattcccaa ataggtgcaa ataggttcat tcgttggttc attctgcagt  169846347
cagggagctt tcagtctact ggcatgcaag acgcaatgat aatgagaata  169846397
cttcacaatg agtgtgacgt gatgactgat gaatgtgaca aaggagaagt  169846447
aggatgcact tagacagcct gggggaattg agttgtggcc agaagggaga  169846497
gagagtgtcc attctccacc tcatcacttt gctgccaaga gaaacaggaa  169846547
tttcttagac aagttctcag gtccctcggt gagactggca gcctaaaaaa  169846597
ggcaccaggg agcagggggc actcacatca tgccatcccc ccacagagca  169846647
tcccgctggc catctgcatc agcccgaccc ccacaggata gaagactggc  169846697
acatccaagt tgctccttcc acaccctctc cccactgagg cctcgtctcc  169846747
tccgccctgt ggccaattga aggtgaactc ctaacgtgca ttctgcctgg  169846797
gatcccagag gttgtggcag ccagatgagt cacctcacaa atacagcacg  169846847
tgttcctcgg gggcggcggt gggaggaaac acgtgaagag ctctctctgt  169846897
gataatagac catttagagc ttcagatggc gaaaacaagc tgatcaggtg  169846947
caggccctcc aggaggctgg caggtgactc ccagccagca cgccctccat  169846997
cgcacgttgg ggaagctgga aagagcctgg tggctgccgg gcctccctct  169847047
ggcatcctct ctccctccaa ggctgtgtgc tccccacctt gtctctcctt  169847097
ttttcattcc attgctctgt tctgtttctg tctacccatt cgtcttttct  169847147
tcctcttctc tttctgttgc cattctcttt ctcttctcct ctcaacatgt  169847197
ccttctctct acccgtttcc ccctcccctt ctctctctcc tccctctttc  169847247
cctctccctc tcttcctttc ccaaatctct cttagccagg ctccttttcg  169847297
ccctttgcct ctcaaaccct cctccacctt tccaccctct ctctgcgttc  169847347
tgcttctccc ttcttccttc cgtgtctctg gctcacttat ctgccctctc  169847397
cacatcttct tccatttgcc accctccctc tctgtagcca cacccagtgg  169847447
gctcagagct gggtctttct ttttttttgtt ttttcttttt tctttttttt  169847497
tttttttgag atggagtttc actcttgttg cccaggctgg agtgcagtgg  169847547
cgcaatctcc actcactgca atctctgcct cctagtttca agcaattctc  169847597
ttgcctcagc ctcctgagta gctgcgatta cagtcatgcg ccaccacgcc  169847647
cggctaattt tgtattttta gtagagacgg gatttctcca tgttggtcag  169847697
gctagtctca agctcccgac ctcaggtgat ctgcctgcct cggcctctca  169847747
aagtgccagg attataggtg taagccaccg cacccagcca gatctaggtc  169847797
tttcatcccc ctacacaacc ctggcctggc ctgggcctct ggtcttgggc  169847847
ctggaaggga gtcccatcct ccctccctca gctggatttc ttaaggataa  169847897
aacctttgct ccttccttca ccacacctct ccacatccca aactcaagcc  169847947
cacagagccc agctctgggc ccagggtgtg gacggggagg gtggctggtg  169847997
gcccagagct gagccctgtg agtcaacagc atgcctagac tcacacacag  169848047
acacatggcc caccttcagg gtcatgagga ttcataaacc ctattctgcg  169848097
aagtgcctcc aggaatcatc aagggagcta gggcagctct gagtctccac  169848147
caggcccacc ctccgcctct cagggctgag cttcacttcc cttcccaaag  169848197
gggccaggga gaggggctgc tgatgacatg atctcagagg aaggccaagg  169848247
cctccaggct gcctctgggc ctggcacagg aaggaggagg agaaaatagg  169848297
gagcccaagg aaagatcaac ccagcccagc ccaaggaccc ccagccccag  169848347
ccccagcccc agctgggctc aaactaattg aaaacagact ggaaaaggct  169848397
gcttttgccc ttcctctagA CTCAGCATCA TCAAGACTGG AGGGACAGAG  169848447
CATTTGAATC ATCAGACGCT GGGCCAGACG TCACCCCACG CGTTTTCTCA  169848497
TTTTATCGTC CTAAGAAGCC CAGAAGgtgc gtaaaatggc ctgtcccaaa  169848547
cagatgagga cattaccttt ctcctcttcc tcctcctcct tcttcttctt  169848597
cttcttttg cttcattttt ctttcatttt ttcccccaga tgttgcattt  169848647
cagagaggct gagcgtgttg actaaggtca cacagctaca aacatcaggg  169848697
```

FIG. 1.51

acctgcgaaa aagctctgtt ccctggtgac aggtgttctg tgatcctaac 169848747
acagccggag gtggggacaa cgtccttgca gtaacaaagg ccctgttgct 169848797
caactcagtg gacatcaggc cctgttttca ttcattagca ggtcagggat 169848847
tccagtgtca cctgtgccat gtattccagc tgatctacct gcaagcctct 169848897
actccccatt ttcccagcag cagccgcaga caccacccaa ctggcagaaa 169848947
tttcaaacaa ggggttctgc cttgcactcc ggtgcaaggg ttgggcacgt 169848997
ggactcacat gtgaccaatc acattgtctt tcctgagatc ctgcattttg 169849047
accagaggaa tcaagaacaa aaagtggtgg caactgattt atccttaaga 169849097
aatccaagta atgagttcct gctgccaaga tttctgggat ttccctggct 169849147
cctgccagtt tctggatttg gttcttaagc attttctggg tgtgtgagcc 169849197
ccataccctt ctcatagctt cttcagccag agtcagtttc tggtttttgc 169849247
aatcaaaaat aacccaacta agatttgcta tcctgcaggc aagagagggc 169849297
cacagcttga tagtcaaggt tagccattgt ctgggccctg cctgccccag 169849347
ccagctttct ttcctcccca gcctgtacct gccaccctga gcacaccaca 169849397
ctggtacacg cctgtgtact tgtcttttat ggtctcacta taatttattt 169849447
aatccctcat taatgaacat ttctaagttg aagtataatt catgtattag 169849497
tcagggttct ccagagaaac agaaccaaca ggatgtgtgt gtatatatat 169849547
tatacacatt attatatatt acacacatgc acacacacag acatatctat 169849597
atatctagag agagaaagag atttccttta aggaattggc ctacatgatt 169849647
gtaggggctg gcaaattcaa aatcggcagg gcaagtagtc aagggaaatt 169849697
caaaattggc agggcaagaa gcctagggaa aagttgcagg cagaattgtt 169849747
tcttcctggg agagacctca gtctttttcc ctgaaggcct tcagctgact 169849797
caatgaagtt tacccatatt atggagagta atccactttc ttcaaagact 169849847
cctgctttaa atgttaattt ctttgaaaaa attgccttca cagcaacatc 169849897
tagactggtg tttgaccaaa caactgggta ctatggccta ggcaagttga 169849947
cacgcaaaat taaccgacac aattcacata ccgtagcata aaatgaaccc 169849997
ttctaaagtg cacaattcca tgtttttagc atgttcacaa ggtcatcatc 169850047
atcacgatat agtcacggaa cttttttttt ttttttttta agacagggtc 169850097
tggctgtgtc acccaggctg gagtgcagtg aagtgatctc aactcactat 169850147
aacctccacc tcctcagttc aagcaatcct cccacctcag cccctcgagt 169850197
agctggaacc acaggcgcat gccaccaaat ccagctaatt tttgtatttt 169850247
ttgtagagac aggggccatg ttacccaggc tggtctcgaa ctcctgggct 169850297
caaggtatcc acctaccctg gcctcccaaa gtgctgggat tacaggcatg 169850347
aaccactgcg cacggcccag tcacagtaca tttttcttgc cccagaaaaa 169850397
aaaccctgac tcctcccagc tcctggcaac caataaacac attggtctgc 169850447
atgttgttca tgctggttca ccttcctcct tgcctccctt tgactgcctc 169850497
ataaatttcc actcattcct caagagttag cccttctgaa atatcttcct 169850547
tgatcccacc tactagaagc accctgtccc acctcaaact gagtcaatca 169850597
ctttattttc tgtgaacccc caatataagc tgatggtgcc tcctggaata 169850647
gcctttagca aaagatatta aaattgccta atcaacttgc ttctctttct 169850697
caccaaacca gcagttctta aattatgatt tcagggcttc ttgacactta 169850747
ccccatattt ttaccatttg atgtgcttgt gtttccggga agagagttca 169850797
gggtttcatc agatcttcaa aaggatccca ggaagggcca agagccttga 169850847
gattagggct tctcgaaggg cagaggcatg cttcatgagt tcccttgtgt 169850897
ccttatgcct ggtgcagatg aggtctgctg gatgagcctg ggtgatgaat 169850947
gagtagtcac atgtaggaaa agtgtccttc cttcaagggt tttccatcat 169850997
cactctctat gaagcagtga aaaagcaaaa caaagtaaca tacggttaag 169851047
catcagagga ggaggataga cacataatta catattcatt tgttcatctg 169851097
ctcatccatt cacaatttag tgtatgcatc tacaaggtac aaagcccagt 169851147
gctcccagca gcgggtgttc agagctccga gaagcaagca ggcaccacat 169851197
gttggtctca gaaggtagag agagactgta aagtaaacca aggaaggctc 169851247
cctgggggag aggccgcatg acatgagcga agccaagagc aaggactggg 169851297

FIG. 1.52

actcagccag atggaacaga gcccggggaa gggtgtcttg agtgtgtgtg 169851347
ctggggggag catccacgtg agcaaatgcc aggcctgcag aggacccaga 169851397
gaagggagag aatttacaca cccacagtcc ctgaagcctg gagaggactt 169851447
tttaagattc ccggtgacgg tgcagagaag ctgagccggg gcctgactac 169851497
agtgaggtgt ggggtgtaat taccaagcca gagtgcagag ctgagccaag 169851547
caggtaagag tactgacccc gagcccactc gggctctgag cagaaggaag 169851597
atttcattag tgttagagag gaaggatgtg ccttctcccc cggaggccag 169851647
agggcaggag accagccagg cggggaggct gacccaatgg ccccggaatg 169851697
gtgatggagc agcctgggag gctgcaggca ctgaaggaag aggtagggga 169851747
cgatgactcc atctgtcacc tcggcactta ccccaaaaga tggaggactg 169851797
ctggcagaaa cagacagaaa tttcccttga gaaggagaaa gccatgctat 169851847
aggcaatcaa gatttgcaca ttgtcagcag agaaggaatg agactgtctg 169851897
gttgccgcta gactttggcc agggctgtcc tgcaggtaag ggcctcgtgc 169851947
aggaggcccc tgggcaaggg ccggcccttc tcctctccct cagtgtcctg 169851997
gaaaggcccc agggctgccc caacccctga cctctctcct tctttctcca 169852047
tattgctaga ccccccttctc ttggtcccct gcctcctccc actggtgtgc 169852097
acccacacct tcagacagtt ctgagcagac cacgcaaaat acaactgtga 169852147
tgttatttgc agcaggcatt ctggacccag aactgtgctt ggtcttgaag 169852197
ttgaaaggta gcaatcactc atactcctct cccatgaaca atttgagaaa 169852247
aaatggaggc tcagggcaga agttaccccc tttacaactg acgggagcta 169852297
tcctggggaa tgaagcctga ggctaaaacc tatgccctat ttccagcctc 169852347
atgaagtaaa cttagccact gggtccctag caaagaaact ggagaactga 169852397
gggtctcccc caggtctgcc ctccaactgc cccaagcccc acatgcctgc 169852447
aggcggccct gggatatctg ccatgtgcag ggaataatga gcctggcagc 169852497
tgcaagaagg agatgagctc cagggtttga gggttaagga cattcaccag 169852547
tctcccagca cactcatctc caccccaccc cagtgaatga gactgagagg 169852597
gctcaaggtg gggggcaacag gttctctcca ttaccttcca gccaatacct 169852647
gcatgtacat tgagatactc agtaagccat gagaagcgct gtgtgaccat 169852697
gactgagttg tttaaactct ctgttcatgc tcctcccctg caaagtgaag 169852747
gcattcaaaa tcatctgtat tcatggtgaa cctactttgt tctaaggcct 169852797
ctgggacatc caaagttgga taggccatgt ccctgaccca gctgactgct 169852847
ctcacccttg ctttcactgt gtgaaattct cccacattga cgggctgggg 169852897
gtagggcaac tacaattgag aagcacaagg gagccccccg tggtgatgaa 169852947
acagttggta tcttgactgt ggtgtttaca caaatctatg tgtgtgataa 169852997
aatgacacag aactacacac atacacacac ccataagagt gcatataaaa 169853047
ctggttagat ccaagcaagg tgtgtggacc atgccaatgt cagtttttttg 169853097
actttgacat tgtcctgtgg ttccctaaga tgttaccact gggggaaact 169853147
gggtgaaggg tgcaagggcc tctcagtatt attatgggaa ttttctgtga 169853197
gtctataatc ctttcaaaag aaaaggttat taaaaaatct cacatgactt 169853247
ctcactactc tgcttataaa atccacactc ctcacggagc accacaggcc 169853297
cgctgtaatc tggcctctgt ctcctctcca acctctcccc aagctcccta 169853347
ggcccagccc catccccttc tctctgcacc ttgagcacac ccagcccact 169853397
ctgtgaggct gtaggccttg ctgtttcttt tacctcaagt tctctcgccc 169853447
caaatcctaa acacaagtaa cttctgtcat tcaaatttca caatcagtct 169853497
ccttttcttg taaggccttc tttctcaggc tgatcccttc agccctaata 169853547
cagttggccc ttccactgtg tttagggtgc tacatcacca tcacctcttg 169853597
gtttttggct aagatcaagt gtagagtcct gctatcatca gacatgatct 169853647
gattcgtttg tttgcttacc tatcactgtc agtccggacc tcccctccct 169853697
ctgagaatga agcagagaaa atgttatctt ggtcaccagt gtatcctgga 169853747
aactgcaaca ggggcaggca caggcaggag tgcagtgaat atcaatggta 169853797
gatgaatgaa tgaatgaatg aagaatgaat gaagaatgaa tgaatgaatg 169853847
caccacacaa agtagcattc tagcagaagt gaaaacaagg ttacctagtg 169853897

FIG. 1.53

cagactttcc	cagccaggac	tcatactatt	tttaaacaca	tacacctgct	169853947
tcggtgatgt	actgaaggcc	tcaggctact	ctccccgccc	acatctccca	169853997
cccctctaac	aggattcaaa	tctccagtgc	tcatatttcc	tcctcatcac	169854047
ttacctagca	aatctggctc	acagtataat	atcagtcatt	tatacttcag	169854097
tctgaattcc	aggtcagtgc	caacttcctc	cagatatttg	tggtttaagc	169854147
ttcatgtgat	attacgtcat	cttaagggca	tttagtaaag	gggaagaagg	169854197
aacatttttg	gacagaggcc	ttttcctgtg	ctcatttgtg	cctcacagga	169854247
agccaagagt	aaatgtgcat	ctagacctac	aggggaggtc	ttggcagtta	169854297
cagcaaactc	agggaatttt	aaatatgccg	gaaactttcc	agagccctga	169854347
gttgcagtcc	cagctctgtc	actgtctctc	tgtgctttgc	taaacagact	169854397
tcgcccctcc	gtgggccgtc	tgtgaaaata	gggcccagct	cgatggcata	169854447
taaaggccct	ctgacttcca	gtagtaaaac	tctagaggag	cccttgtttt	169854497
ctggggagac	tctttctgag	ttttcataat	aatgttgagt	agttctcttt	169854547
tcttgctcac	gccgactttt	ctccagttct	cggacaccag	ttctgggtac	169854597
ccaacaattc	aatccagttc	tgacactaac	tatccagagt	tagcagaggc	169854647
cccacaggtt	aaaggcctcg	tcccacaaaa	ctgcccccac	ttcagacacc	169854697
agtggccagt	ctcagacccc	ctgtacttct	gaccaaccag	ctataagtca	169854747
aggattccta	agactccttc	ctcaggtcta	ataatttgct	aaagaagctc	169854797
acagaactca	ggaacacact	ttacttatgt	ttactggttt	gttttcaagg	169854847
atgcaactca	gaaacagcca	aatgaaatga	ctgaatcagg	caagatatgg	169854897
ggttggggga	tgaggcatcg	agtttctatg	ccctctccag	gcatgccttt	169854947
ctcccagcac	ttggacgcgt	tctccaacag	ggaagctctc	caaatcttgg	169854997
tgcttagggg	tttttatgga	ggttcaatta	cataagcatg	attgatcaaa	169855047
ttattggcca	atggtgactg	actcaatctc	cagcctcttc	cttctctcca	169855097
gaagttgggg	atggggctga	aagtctcaag	cttccagtca	aggcttggtc	169855147
tttttggtga	ccagcccaat	cctgaagcta	tcaaaggctc	accaagagtc	169855197
acctcactgg	aacaaaagat	gctcctatac	cctcatcact	cgggaaactc	169855247
caagggtttt	aggggctttg	tgctaggaat	gggagacaga	gaccaaatat	169855297
ctatctattt	atttatttat	ttatttattt	tttgagacgg	agtctcactc	169855347
tgtcacccag	gctggagtgc	agtggcacaa	catctgcctc	ccaggttcaa	169855397
gtgattctcc	tgcctcagcc	tcccaagtag	ctgggactac	aggtgcccac	169855447
caccatgcct	ggctaatttt	tgtattttta	gtagagacgg	ggtttcacca	169855497
tgctggccag	gatggtattg	attccctgac	ctcatgatcc	aaccaccttg	169855547
acctcccaaa	gtgctgggat	tacaggcgta	agccacctcc	cccggcccct	169855597
ttctatgaca	ccacagatgg	gcacagtcag	aatcagagcc	tgaggtgcag	169855647
gtcaaatccc	ttagccctcc	accagtcccg	cccacttggt	ttctgtggta	169855697
gaaagttttg	tttactatct	gtatctgtat	cccccaccaa	atgcgagctc	169855747
ccccatccca	ccctgatgct	gaactgagga	cactcagggc	tttgtgtggc	169855797
tctggcagct	tgcacaatgg	gttctcagat	gaggtattcc	atgcccttct	169855847
tcctggagta	gtaagagtca	atgcttttca	gttcagcaga	aattcatgag	169855897
atattagaaa	gcacttccta	gatctgcgta	gaagttggaa	taggttgcat	169855947
atagaagcta	ggaaggttcc	atccctggag	atctttagga	agatcccatt	169855997
gctctgggtg	actcagtcgc	tcatttcaat	catgaattac	aggcattatc	169856047
gagttaagtc	accatggtgg	ctggacctgc	tttctccaaa	gtccctccag	169856097
ctgcaggttg	gtgagcccat	agatggggtt	agtgaagcat	tgttggtcag	169856147
ctcaccaggg	cacccttatg	agagtgaagt	agaccgtgac	tcctctgcag	169856197
ttggttaagg	aagaggacac	tgaacaaagt	catgtgttaa	gagtggtgtt	169856247
tggctggcaa	attctgattc	atctttcagg	accctgctca	agcatctcct	169856297
cttttgagaa	gcctggcctg	gccctctccc	catgccccac	tcttccttcc	169856347
ccaggtttaa	ttaaatgtct	cttctcagct	ggtgtgacct	cttggttgat	169856397
tgcaaatagt	gcatactcca	ctctctctcc	acggaactgt	gagctttcta	169856447
agggccagaa	ccatacccac	ctcatctctc	actgcctccc	tggtgccatc	169856497

FIG. 1.54

gcaggacagg tggggcagag caggggcccg gtggctgctg gctaaattgt 169856547
tggagggact ggctgggagc ccatacatca cagacagcag ataccccagg 169856597
gactggcagt gtgggaacca ggtgagaagc cccagtctca ggtctgcagc 169856647
cttcctcagt ctcctcactc agtagccttg attcccagca aaccacatca 169856697
atttctcatt gcacaccctg ctcaatgctc atctgcatag tgtcctccat 169856747
ccagagcagc cctgagctgt gggcacgaat actaatggat catgcaaatg 169856797
ccagcctagg gcaagagtgc cctggactgt caattagctc cccccagcac 169856847
cagctacagt gcccaacccc ttcacttgat acaggccagc ccaatgcaag 169856897
aaggagcaac agaaaaagaa ctcggcttga aggactgctc tagtcaaggt 169856947
agtgtgttgt ggcagcctgg aaagggatct tccatgtaga gtgagggaag 169856997
aagagagcca gcctggcctc tcaggaagag gttcccacag gcactcttgg 169857047
gaggaaaggt ggtgctcttg gggcccagg taataattgc tacacgaatg 169857097
ccacggctct tggaactgct gcttcatcct tttccctcca cctggccatc 169857147
tatgtgccag gccaccagcg tacgtcctgt gttgtcctct aaaccaagac 169857197
caaagctctt cacagccact cttctctgac ccagtaccaa ctccatcctg 169857247
ggagggagga tgacaggctc cccgtcccct cacctcttct tcccaatact 169857297
gctgtttcct cccagttctt tctcttccct ccactgctcc catctgcttt 169857347
ccttccttag tggataaaag cattaaattt gaaggcagag agatcgggtt 169857397
caaacccaga ctctacagat cactcaagct ttgtggcttg ggcgaattac 169857447
accatgcctc tgaacttcag tttgctagtc tataaaatgg agaaaagaga 169857497
agtacctgcc acagtggcat tgtgaggatc attttatgaa tagctaagaa 169857547
tttcaggtaa ctcactctga tgtaccagaa agttactttg cttactgctt 169857597
caatcactga acttaatttc tactccaagt tcccattcct ctcagtggca 169857647
gagaaccctc aatcagttca ggatgcccca tccccagtgt tgcctgaatg 169857697
ttttggggtg ggcttacgga gcatggagcc tgaagtgggc tctacctctg 169857747
gtgggcagcc ctaccattcc tacagaaagg caccccaaga ggttctgctt 169857797
cctgtgcatt ctgtggtcac tgtgccattc aggtcgcagc tggggcctcc 169857847
caggctctag gagggtttcc tggaccgcac cactgttggg tgcaggggaa 169857897
gattcccctt ctccttaccg gacttgccca ggagaggtag gtcaggaacc 169857947
cctgcctgaa aaagacacac aagtcagtgg ctgtgcaatg ctcctgctac 169857997
acacagaggt ggcaggcctt agaggggaac cctaggctgt gttcactctc 169858047
ccaggctcca ctttggaaaa gccagggtct gctctcagct cccacattcc 169858097
gccaaagtct ggggtttcag tgccaaacag gccaccaacc ctcgaactct 169858147
gcctgaggtg gaggacaagg gcaaacccct cttgctcctg ccctccaacc 169858197
agtcacatat tcttccaggc ctttcatctc aaaatccaag atgtgaccat 169858247
tgtttccgtg ccacctctgc cacaggtagt gaatgccgca gctcaaatgt 169858297
gcggcaggtt gtgtggtcac aggaaataac agaaggagcc ccggttaata 169858347
tctcagttgt atgtggcctc atttttgcag gccctgtccc agagtcagtc 169858397
ctcagcacga gggcagctga gactcttttc tcccccattc cttcctcctt 169858447
ccctcttcct gggtttcttc ctttttcagg ctccaattgc agcagcagca 169858497
atgctgggag cggagatcct gggagcccgg agccagctct gacatgttca 169858547
gcgggccgtg cagggtcagg ggcatgctca tcggctcatc actggcatga 169858597
ttactaatca tcaggcagcg gcagggttac tgttccctcc tcccctccct 169858647
gctcacttcc tcagggtctt caggctgcag gagccgaaga gggaaagacc 169858697
ctgcgtgcac cctggcaggc tgataatcac agctgcagcc cccaggcact 169858747
aaaaggatgg gtgggagcat catccaccac tcaaagggct ggggaccctt 169858797
gtccctccca tgtgcatcca tctctcctat ctctgagtcc ccagtgaact 169858847
gctgcctccc tagagaaaca gtgctagaag tcagtggcaa gagcagcagg 169858897
aggacttgga gctacatgca gagtgtgagc tccggagtca gaccagctga 169858947
gttcaaggcc agctccacca tctattcact gtgacttcag gaaggttgct 169858997
taacctctct gtgccttagc tgcctcatct ataaaacagg aaacaatgag 169859047
agtctttcct tatggggcta ttgaaatgat taagtgagat caggcatgtg 169859097

FIG. 1.55

atggcacaca gtaagaactc cataaacaga ggtcaccact gctaatgcaa 169859147
ttattctatc acctcaggag actaaagcag gggaggaaac accattgact 169859197
cctggacatt tacccaagga gattatggat ccatgttttg cacacacttt 169859247
agaaagacaa ggaattctaa ccacagcatc tgtctccact gcccccgtca 169859297
tttcagtctc acccgtccac cctcaacctc accactgtgg cccggaaatg 169859347
cggttgccca gggccactct caccccacct cagccctgct ctgctcaagt 169859397
ctcacttcca ctccttccag ctcccatccc tttctaccca gctccacccct 169859447
gatttctcca ccatgacctt taccctccta gtctgatcta gacccctgat 169859497
cttgccgagt atctaggact ttggtgcctt tgaccctcag cagcagaggt 169859547
agagagggat ctcggtgaag tctgggatgt tatagtgact tgtttatcta 169859597
agtgccctga gactgtgagt tccctaatgc agggagcatc aacctctgca 169859647
gagagcccca gagccctgct caggtgtgat gaacaggagg cactcacttg 169859697
atgccctcac aaagttgtga gtgaatgaat gaatgagtga atgaatgatt 169859747
gaatgaagat tagtgattat gttaatgacc tgccttttc atgagccttg 169859797
caacctccca ggtaccacac taaagcactt aaatgcttcc actcatttaa 169859847
tcctcatagc aaccctaaga cataggcgta attattgtac ctattttata 169859897
gatgttgaaa ctgaggatca gtgaagttaa aggcacacag ctaagggatg 169859947
aatggataaa atcctttacc ataacctttc ctccttagga caaagtttct 169859997
tcaccaactg tccaaggctg tgtttcactg ggagagtct gaaattctac 169860047
accaagcatg agcatgtgtt catgcagcat ggtaactctg ggggaaaagg 169860097
ttcacaggtt ttatcagata cttacagttt gttagaacat atttgaatcc 169860147
atccatctaa ccacccgtcc cctttcaatc caccccttctg tccaccccca 169860197
gacagccatt tgatcaatat tcatgaaata tctgccttgc gccaagcata 169860247
gtgctggcac ccatgaattc cctggtctcc agaaatatcc ttccccctct 169860297
ccctgactac ccctgccccc gcctcaccac acacacactc cttgcaggat 169860347
ctgggtaact gggagggctt taccgccagt gtcccagctg cgtgggtggc 169860397
tgcactctgt ctgaactcat ctcagctctg gtggagactg tggcagcgca 169860447
gaagcgtgca gggggaatcc tcaggcagcg cagccatcag gacatgaagg 169860497
gcagagcctg tgccccggct tccccggctt ccgctgcagt ctacatcagt 169860547
cctgctccct ccagaacatg atcaaccggg acagatgagg ccatgcttga 169860597
tgcataagga tgcagccagg gagagctgcc tcccaaaccc aagtcctatt 169860647
caaaggtctt ttcttcctcc tggggaggta ggggagaagg tccaagcaaa 169860697
gggaactgga aggggaaagt gaggcatgga gtttgtgttt tctgaatcag 169860747
gactgtgttc cagccaggga gaccctgtgt caggcacttt tgtaatcacg 169860797
atcactttca gcctcacccct gcgacctcca acgacattgc tgagattgtt 169860847
ctccttgcaa acatgaggaa attgaggggc tcaaaggtca aataacttgc 169860897
ccaaagtcac aaaacaaatc cgggacttta agcctgatct gcttgacctg 169860947
aaactcatat ctacttccct gccctctgaa gatctatatg tcctatgtca 169860997
tcacttcact gttcacacaa ggtgatacct ggcttctcca agcacctgct 169861047
accctgaact tactgcacca ctctttcctt cctagCCTGA ATGCAATTTG 169861097
CAATGAGGAG ATGATTTGAT TTTCTTCAGC CCTAGACCTC CAGCTTCCTG 169861147
AGAGCAGgta ctcttgcctc ttcttgctca ttattgatcc atatatttag 169861197
aatagcgcct ggcaggtaga tggtgcttaa taaatattca ttgaataaat 169861247
gaatgaatga atgatccaat gagccccaaa gcaaataaca ataaaggaca 169861297
tttgcagagt gctctacaga gagacaagtg ctttcccttt actttatctt 169861347
accccattct cacaacaatc ccctgacatg attgggttca tgtttcacag 169861397
atgaggaggc taacggccag gtgtacatac caggggacat gggactgggt 169861447
tcatatgagc tcaggggtaa atgatgacac cctttcccct gccctgaagg 169861497
atctcagttt gagtatttgt agcacactta ggatgttctg ggccaggctg 169861547
agtggcggtg gatgggggcg gtggaggtgg ggtatgcaaa gcaggaaact 169861597
cggcctttgc tttctaaaag ctcccagtct atttgaggcc agacttatgc 169861647
atgcagaaca tttgggaaat ggtacaagac agcagcaagc atagtgctga 169861697

FIG. 1.56

```
attgcacata atcaggtgcc aactgcattc ccttccttaa ctaatctgag  169861747
tcttttaata ccagatgggg accctgagaa tagatttcct atcaaacaga  169861797
tgaagagcaa agatgggagc cgagggaaat gctgtggctt actcattttt  169861847
ataccccctgt aacccagcat gatgtctggc ccacagcaac aggaataggg  169861897
cagtccacct tcaataatgg gccactctat gtgccaggca cctgctaagg  169861947
gccccacaaa catcatgtca ccaatccctc acagcaacac taccacttac  169861997
taaaggaatt atgaaagtaa tccacaagaa gctgaaagca gggttcagag  169862047
atcgtactca tcatgcccac agtctcagag taaaggggca agctcagtgt  169862097
ttgaacccaa ttctagcagc ctcccaaatt aatgctctca atctgactct  169862147
atgctacctc tgtgcctgga aggaactact gttgtccata aggatgagaa  169862197
gaaacatggc taagggagca ctgagtaggg aggaaggagg cagcagggag  169862247
gaagaaataa attaagaaag aaagagatac aaagaggaag aaaggagagg  169862297
gggagggagg gaaagaacag ggcttgtgtg ttacataaac tcagacaagc  169862347
acatgcatgt tttaacagga ttcctgcagg tctgacaatc tcactccttc  169862397
ctccctgaac aaccttagag gggttgccta aggagtccta tatagaggct  169862447
tatggcagaa ggaaggcctt gcgtccagaa ctttctgagc tcatggattg  169862497
acactggggt tgcgcatcag tctgcttgga atgccttcaa aaaatacccc  169862547
agtctgggtg gcttatacaa cagaaatcta ttttctcatg gttctgaaaa  169862597
ctggaagtcc aagatcaagg tgccagcagg gttggtgtct ggtgaggcct  169862647
ctcaccttgt gttgcaactg ccttttccct gtgtgctcac atggtatctt  169862697
tgtgcgtggg gggtctttgg agtctctcct tgtaaggaca ctaactctat  169862747
cagatcaggg ccccaccctt atgacctctt ttaaccttca ttagttcctt  169862797
agaggtccct tcttcaaata cagccataca ggggcttaga gcttcaacac  169862847
agggattttg gagggacaca aacattcagt ccacaccggg gtgcatgagg  169862897
gaggggtcag agctggagaa agtgcatgag ctagttcacc ttccagagta  169862947
aagggagcaa cagccactga agctcaggtt ggatggggct ggcaaggtcg  169862997
ctgtattgag tacatcatgg gagggacaac aggacaaatg gctcctgcag  169863047
tcagggtgac tgatgggagg cttcttcagc actccctctg cacattcatt  169863097
ttgtcactcc ctctctcccc atgcagttct ttgctctctg ttgcaagttc  169863147
ccaggaggca ggcagagggc ctgttatcat catctttctc tcttgcccct  169863197
cacacttacc tgtgttcttc tacttagaca cattctttgt gagcatctca  169863247
tgggtgatgt tggctgcatt gtacagtggg cacgtgcgta tgtgtgtgta  169863297
tttatctgca aataataccc atgtcacaag gcgtccgcag gaataaatga  169863347
gctattgtgc atgtaaatat ctggtacatg gtagatacat gaatgaatga  169863397
atatttgttg aataaataag tgaatgaatg aatcttcact tggcagagca  169863447
tgtgtcttcc tttaaggggc aaggatgatc tggtaatcat cagtttctgc  169863497
ttactaactg ggtcactgag caaagaaaag agactcactc attcatttat  169863547
tcagcatagg ttggctgcac ccctgtcaga aaccggaggt taagcagaaa  169863597
gtagagagtt aaatcagtat gtaaagcagt taaaacagtc cagagggaga  169863647
gacaggcaag gaaaggaaca atgagaaaca aagtaaggag tgctctgata  169863697
agaagccctg ggtgctatgg aaaccacaag cagggcaccg actcagggcc  169863747
agggagggat ccctggagga gatgacatct gcagtagata ttccagggta  169863797
agcagcaggt ggccagaagg agaaagaggt gaggaacatt ccaggcaagg  169863847
ggaacagcac gtgcaaaggc cctgaaggag aaccacaaca cgcatctgag  169863897
aaatagtgag gggtctgggt ggctgagcca caaagggaac accaggggtc  169863947
agggaggatt tgtagaagaa gccacaggcc acaaaaaaga cctcataatt  169863997
catgttcaat ggtttggatt ttattttggt gacttcactt tatacctact  169864047
gttcagaggc agccaattgc aaacacgtcc agaagcactt tgctatttct  169864097
gatctgcaaa atggagcaag tcatctgtac tctgcttctt cagtgggttg  169864147
tggggaagca gaaatgagag gatgacattc tagccttttg tgacctctca  169864197
agtgctgtcc ttatggtcat tcaggtacca tgaaaattag cagagcccca  169864247
agggggaagt agcttggtgc tcacccagtg gtatccctga caagttggca  169864297
```

FIG. 1.57

```
aagacaccca gggtggctta actttctcct cagcaaagag ctctcctctg 169864347
ttccctgaat cctggatatc ccactgggtc ctctagtgac cccaagcttc 169864397
agcctcgcat gccctcttct cgaacagaga aggcaggagg gaagcaggga 169864447
ccagcccctg ctccatcttc caggattcca ggcctccctg gcctggacaa 169864497
gccctgagct ggcagttagg agagcagagg ttgtgaatct ggtgggaccc 169864547
ccagcaggtc tttctggctc agtgccctca tctgtgagca gGGGTTCCCC 169864597
AGGAGACCAC GACAGAGGCC TGGAACCCAA GTTCTAATCC CACATCCTGG 169864647
CTGGGCAACT TCAGGCAAAT TTCTAACACA AGgtaagcct caatttctct 169864697
ctggggtaat gatcaggcac ctgcttaatt cacaggggtt tggtgggcat 169864747
cacgtggaca atgtggttgc acagcagtgg gcaatgcaaa ggaaaggaag 169864797
tatgttagta agtgcccctc ccctgttgca caaaacagga cacatgctgg 169864847
gattgcagaa aagcaataaa tgctgcacag gtgaagaaaa ctattcaagg 169864897
accctggcca agtcacaggc tacctgtggc cctgagggga cagctcatgg 169864947
gttggcatta ggggaagcag ctctcaaggg gcctgtatcc tggggattca 169864997
actctgtgcc tatgtggcat tgagcctgtg tgaatgtggt gactgtcatg 169865047
ctgttttgct gtgtgtgcgt ctgcatgcct gtgtgtttgt gtgtctctcc 169865097
accttcgtgg ggggcaactg taggtgtatt atgagccttg ggtctgtctg 169865147
tgtgtacaat agcaatgtct gtgcggactt aaggacctgc gcccatatgt 169865197
ttgtgggact ttctgggcat gcatgcttgt ttatgaggcc atacatccgg 169865247
gtattctgtg aactgctagc atggtgtgta tctgtgtggc agacagaaaa 169865297
tggctgggtg ggattgtagg gggcagcttg ggcaaaggat cctcagtgtc 169865347
aatcaaaatg ggtctcagtg ggaacccaag cagctcagac ttgggggagg 169865397
ggaagctctt cctccacctt ccagggagca aaccttgcaa ttcaacacca 169865447
caaggctttg agtccacagg cagggacgca aactttgccc attgggtgag 169865497
acgccactca cagaagggaa atggcttcct aaatctaatc attgcccctt 169865547
caagcactaa caacccgtgc ccaggagctg atggctaatg aattattgag 169865597
ctggaaaggg agaagaggta gaaccaagga ggaaagaaac agaaaaatga 169865647
gagagcaggc cgggtggggt ggctctcgcc tgtaatctca gcactttggg 169865697
aggccaaggc gggtggatca cctgaggtca ggagttcaag cccagccagc 169865747
ccaacatggc gaaaccccgt ctctattaaa aaatacaaaa aaatttagct 169865797
gggcctagtg gtgggcgcct gtaatcccag ctactccgga ggctgaggca 169865847
ggagaatcgc ttgaatctgg gaggcagagg ttgcagtgag cagagatcgc 169865897
accactgcac tccagcctgg gcaacagagc gagactccgt ctcaaaaaaa 169865947
aaaaaaaaag aaaaagaaaa atgagagtgt aagggcccag aggggctgag 169865997
ggctcctttc tcctccccaa ctccctgtca ctagaaggtg ggccctgcca 169866047
taggaggatt ctgcagaacc ctcaaggacc cgcggagcag gacggcacct 169866097
tcttcccatg accacccatt tggatgtgtt tttcacccct ttctgggtgg 169866147
ggcagacttt ccccctcccc atgagttcag gcagtgggtt aaataagatt 169866197
tcccttgaag tcgaatgaaa tcacaatgca ccacacacag ggacacacac 169866247
acacacacac gcacgcacgc acatcacaca cacacacaca cacacacaca 169866297
cacacacaca cacatacaca cacacagtct ccctgggccc aatctactgc 169866347
cccctgaacc tcacccatca gccaggtgcc tggccccggg tctgtctctt 169866397
agggttacat gctcccgggg ctcccgcaca taccccggca gatgagggtg 169866447
cgcaggggtg agggcgcagg gctgggcgtc ccccgccccc accgtgcagc 169866497
cctcgccccc gccccgcccc tccgtagttg cccgcccgcc gccccctccg 169866547
ccgcccccctc cgccgctccg actctcgccc cgagcgctgg cagcaggcag 169866597
caggcagcag gcgggcgcgc tgtggctccg cgccgcgcgg tccgggctct 169866647
gttcattcat gattggtact cggccctccg agacccagcc cgagcgcagg 169866697
gaggggagcc gagtgtgcgg caggaggggc gggcggacgg cggctcccgc 169866747
accgcacgcg gcgctggctc ggcagcctcg gccgggcggc cgctctggcc 169866797
ccgtgtccag tgccaggcag gcttcagggc accgtcctcg gccctgggcg 169866847
agggaaccgc cgggccgggt cctcgcgcgg ggaagcggtt ccgaaggctc 169866897
```

FIG. 1.58

```
gcggggagcg gctagccctg agtccctgca tgtgcggggc tgaagaagga  169866947
agccagaagc ctcctagcct cgcctccacg cttgctgaat accaagctgc  169866997
aggcgagctg ccgggcgctt ttctctcctc caattcagag tagacaaacc  169867047
acggggattt ctttccagGG TAGGGGAGGG GCCGGGCCCG GGGTCCCAAC  169867097
TCGCACTCAA GTCTTCGCTG CCATGGGGGC CGTCATGGGC ACCTTCTCAT  169867147
CTCTGCAAAC CAAACAAAGG CGACCCtcga aaggtaagcc accttcttcc  169867197
ttttgttccc ctgtctgggc ttgggggtgc taggcgccga ggtgggctgt  169867247
gccacctgcc tcccttagtc cggactctcc tctccacgag gagcccggac  169867297
aggtgcttgt atccaaagga gagagaaatc ggcgggaggg ctggtgtgaa  169867347
cacccagagg agggagccgg agtggacgtc tgccccagcg gcaactggac  169867397
ccctctgggg caccaggtgt cgggactctc ctcctgggga aatctctgag  169867447
agccgaagga agcggcatgt tcacaggtgg gggtgaccgg attctctggt  169867497
ggaagtgtgg tgaagctctt cccattccca tgacagctgg cgtttgagca  169867547
ctcagtgagg gtgctgccac actcccacac tcctcctagg cggctatgcc  169867597
aggtgcagac ctgcgagtcc cttcatcagg aagagtgctc tgtctgcacc  169867647
cccaaaacct ctgcaagcca aaaggaatca gctgctgcca ggggtaaaac  169867697
tcccaggcct catgtcctgg tggctccggg agtcaggagg agcaaccgtg  169867747
aagggctggc tgcgagctga gcttacatca aggattaaaa agcataatat  169867797
cgtggagtct cttctgcctg gacgctgttc cttcaccacc tgtccccagc  169867847
cgaggcatgg ctgatctcac catccgtggg agagtcctca aatgggtcca  169867897
ggtgaagttg gaaccagtgt gttgggccct ggaggacaat gcaggtctcc  169867947
ttaccagcag ttcaaaagtt agtggttgga ataaagagac tggaagcagt  169867997
taggaaacgg gaaatgatgg gttttgtttt gtttaatgtt caaatgtcac  169868047
tacgagtggt aagattttaa gcagcttgac acttaaacat tcaaattcta  169868097
ccatcagagc ccccatcctg gatacaggtg ggagttaagc tcctacccta  169868147
caggcctgat agtgagtaga agtgtaatgg ggtaagggac cccaagtgaa  169868197
caataagtct cctcttagaa cttggttggt ctcaccctgt ttagaaccac  169868247
agagatctcc ataagtaagc tgtccttgaa accccctgga agaaggggtc  169868297
ccagcttctg gcccagctcc caggggcatc aggctggctg agccccgagg  169868347
aaagagatct ctgggtgcag atcttaggtg ctgaagctgg gttggcattt  169868397
acatcctaga acataggaag aggctttggc ccatttgtcc agctgagtta  169868447
catgtcctgc tggcaaggaa gggactggtt gtcctgttac cagtcctgac  169868497
cagaacaggt ctgcaaagct cagcccaagg ccttgacatt ctaagcctca  169868547
cctctcacag atcctgggat gctgcttgac tggggacaat tttcagcgcc  169868597
aaatataggt cttctccctc atcatctgtc tgaccaccat gcggtctcag  169868647
aggccagggg actgtgggga caggaaagtc aggggcttgt ttttaaatat  169868697
tttcaatgcc tgtggctctc ctgggagctg ggtgtcacag aaagatctca  169868747
agccctagag tcaagtggag tctgggtgtg aatcccagct ccatcactcc  169868797
ctgcctctgg gaccttagga aagtcccccg cacctcccta agcctcagtt  169868847
tttcatccat gaaattcgta tgctacttcc cggagggaag ggtatgtagg  169868897
aagtagagga agggaagact ctgcctcata tactgtgttg gctgcagcca  169868947
ccagggaccc agaggaagtt gttgtaagga tgtgagaatc aaatgaatga  169868997
tgaataggga gctccgtgca tagggctggg aaaagagtaa gagctcagac  169869047
attgctgtct accatttcct tctcctgccc caaacatcca ggaattcacc  169869097
ctggatgaat tcctgcagga ttcccagagt acaaaggtct ttgcttctgt  169869147
ctcctcggat tctaagaaac agaagagggg gtactggcat tcagtgtgtc  169869197
cctactgtgt gcttgccata atgctcggtg ttttatcaac aactctcatt  169869247
taaccctcac aacaatgttc gtttgaggct catagcaggt tcggggccaa  169869297
tgggtggact cccaagacaa gctatcgaag cactgggcac tcagcccttc  169869347
ctgcacaaag cccactggcg tgagttgtcc aggggtccag ctgcatatgt  169869397
tcccccaggt atttgccccc gaagcacagt catctcactg ccttgcatag  169869447
tggaatgcta atcagcagaa gacccttcta tgggaggcag cttggaaacc  169869497
```

FIG. 1.59

```
tggaggaagc cctggctgag gaggctagtg gtcagggagc ctatcctggc 169869547
caggtcactt ttccccactg gggcctcggt ttcttctttg taaagggaga 169869597
aacttacatt aggcatttcc tcaggttcca tttggttctc aaattctaat 169869647
atttttatgg ttgatgctct caccagagct gctgctatga tctcagagac 169869697
gtgaggctca gatctaatta gaagcaaccg gaagagagca gttgggattt 169869747
ttcaactcag gaatcagtct ccctgctggg ttcaaattca ggctctgcca 169869797
cttactagct gtatgactaa gccttgtttt cctcaactat aaaacagaga 169869847
tagtagtagt taccatctta aaatagctgt tgtgttgtgt ggatttcaag 169869897
gatcatgcaa gtcaagcatt tagcacagtc tctgctacat aagtggtcag 169869947
caaatttgag gtactattca atttatggct ctattgtttg gggcttccaa 169869997
atgtccagag taaggccatt ttcgaagtag gcagtacatc tgagagcctt 169870047
aacagctcat ttctggaaac cttatccagc cctatccaga taactaggac 169870097
caaaaacccc agcacacaga tgctcgtccc ttgcttcaac cctcactgac 169870147
ctctactctg tggcttgtcc tgaaaacatc aaagcctgct caattaaaat 169870197
cctgaatgcc ttgataatac aatttagaaa catacatagt ttttaaatag 169870247
ggcaaaaact ctgcatgatt agtgctgcaa gaagatatcc agcccaacct 169870297
gggtgttcag ggagcgctct ctaaaggcaa cagaaatcta aagtaattta 169870347
agagccatgc cactgaataa aaatattcag gttcatttcc tgtccttctc 169870397
tctgtttggg atctttgtgt gtctttaatt aaaagtagga gagccctgct 169870447
tttgggattc agcctctgca tcccagtccc agatagaatt tctgactcta 169870497
gcagttttgc atgtgcatga cacaccaagg acactgctcc tggccttgaa 169870547
tgggtaagtg agacaggcta gggcattgag gagaaccaga ggaggaccat 169870597
acaggtgcag ctgctgggct tgtcagcggg gcaggagaat ttagggacaa 169870647
catcactaga ccaaggccat ctcaacagag aattgcctag aagcaaataa 169870697
tcccacacta caggggtggc tgggttagaa atcctccatg accgagtgca 169870747
agcatgcaga actttctgaa agggctgagc ttcggatctc cagaatagtc 169870797
atagcatagg tgagctatga ctcaacccca tggctatcag atgctttttc 169870847
taaggccaca cggtgagtta atagggtact ggttaatata gggccaaaca 169870897
tgggaatgtt cccgatagtc ccatatttgc tcctagatca atgagcacct 169870947
cagggaactt atggaagcag agtgtacctg atgagactgg gtttagggtt 169870997
tattggtcag ggcagcattt tcaacctaaa gatatgggag agtgacaaga 169871047
gacagacagg catagagaag cagtagccgt gttgtcacat agtcctgagc 169871097
ccaaggggca ggcctttggc aagtcatttc accttgtaaa tgctagtttc 169871147
tttatctgca aaaggagaat cctgatgtat agaaatgttt gtgctttggt 169871197
ctttacccat ctttgcatct ttgcctgtcc ctttaattct ataatgctct 169871247
cccaccccac cccttgctgc cttgtctaat agttaaaatt ccaccgacat 169871297
tccaagacct cactcagcaa tttccatatt caggaagcct tctccaagcc 169871347
ccagagagaa gtgatttctc ccatctgaat tcccatattc ttttaaggtg 169871397
tacattttct tatgactcac aatcgcgctt ggaattagac aatcaacgga 169871447
ggtgttaacc cccttttcccc accaccagag gtcagggttc ttgggggtag 169871497
gagctcgtct aactcatcct tcacaactct ctgcttggtt ctgtgcacat 169871547
agtaggtact taataaaaat tttcctagag taaactataa ataatggaat 169871597
ggttggccac tctccattat ttgctagaat tgcagaccct gcaggaaaag 169871647
ttagcttccc accggaattt cagttaccag ccctctgcca ggaatgaatt 169871697
ctgttgttcg gtctgctggc tttgaattga ctttgtccat gaaatgtacc 169871747
gaatctgttt accatttagc aggaaagtgc tgagaacagt gattctactc 169871797
ccactccctc ataatcacaa aggtatgagg aacccacacc cagcaccagg 169871847
cacagttctg gtccctcaat cccagaagaa gctcaatgga gctcaagata 169871897
aacagaaaga gagagatgga aaagaatgga agacagagga gaaggactta 169871947
ctgcctaaaa tcagtgggat tgttttgact tggtctctgg aaaagggcca 169871997
aggcttagac ctctttgtct gcctggaagg gccttgctcc atgaatgctt 169872047
tgtaaatctg taagtgaata agtgagcata tgctttaaca aataagtgaa 169872097
```

FIG. 1.60

aagatgaatg attgaatgaa tgggggaagc agtaaaggag tgaatgaatg 169872147
aagcaacaaa tgaattatca actgaatgac agaaagaatg atcgaataaa 169872197
tgaccacatg aatgaatgaa tatgtccata aatgaatgaa tgatgaagtg 169872247
ccagaacagc tataattaac agcctatctt ttcacaaaga gcattgatag 169872297
tcatctcccc aaagttgaaa aatataaatt cagtcaagaa gagtcctggt 169872347
aattttttgg atactggtag gtgtatagtg tctttggaga aggtgaggag 169872397
atgtctctaa gttttcactc ttttgctgaa acaaaagcag ggactgactc 169872447
acagtgattc cccttgtctt cccttatatt tcaggttcgt tcaccccttgc 169872497
ctgggtgaga tcagaatctg tatatttatc cactcattta tttgttcact 169872547
tagccagtcc cacaattgtc cttcagcatt gcttccctgc ctaagatcca 169872597
ctctggcttc ctcatcctcc ctcttcctcc atctcctcat tcacctggcc 169872647
aactcctact tatctttcaa ggcctcattc aatgccaccg ctctgggaag 169872697
cctttcctgg cttctgtagg cagagcacat ctctgccttc tctctttccc 169872747
catagctgct gctgcttccc ttaactacaa ttctgaacac actatgaggt 169872797
tgtcattatg ggtttacaca tttatctctc tgactagctt tcaggcactg 169872847
agtcttatcc cagggcctct gtcaggcctg acactgcatc caggcttgat 169872897
ggatgctggc ggcatggagg taaggatgga tgggccagag tgtgcgttct 169872947
tgatggctct gagcggtgtg agaatgcggc ggtgcagatg aggaatccag 169872997
gtctgctcct ggggagaagc tctgcaaaat tctgcataat ggccgtggag 169873047
ctgatgttcc cattcatcag gcagggaagg aacagttttt agaaaagaga 169873097
gagagagcct aagagtccta gggccttcag agaaacatct ctttaaatgc 169873147
ttccccttcc tccgggtagt attttaaata ggtcaccttc tggaagtagt 169873197
ggtagtcagt tgggatattg ctagcttccc gtaccccagc catgggagta 169873247
gtactttgga ttaaatcttg ttattcaagg ccagactaaa agcctcattg 169873297
gtgcggtggg gggaagtagg aaccacattc cactcaaatc aggaagctag 169873347
aagtaggatt gcattatggc tatgagcacc gcgttaaaat aagagtcttg 169873397
ggattgaact cccctttcatt ggttcatagc tgagcctttc caggcctcag 169873447
tttcctcttc tataaaatgg ggacagtggg ccaggtatgg tggctcacat 169873497
ctgtaatccc agcagtttgg aaggtcaagg tggacagatc acgaggtcag 169873547
gagttcaaga ccagcctggc caatatggtg aaaccccatc tctactaaaa 169873597
atacaaaaat tagccgggca tggtggcatg ctcctgtaat cccagtcact 169873647
caggaggctg aggcaggaga atcgcttgaa ccgaggagac ggaggttgca 169873697
gtgagccaag actgcaccat tgcactccag cctggatgac agagcgagac 169873747
tccgtctcaa aaaaaataaa aattaaaaaa tggggacaat gacagtgtct 169873797
ccctataggg ccacgtgagg gccaagaagg aattgaacat ggtgctgcac 169873847
accaggtgag ttggcagtgc tggctttgct gctgcctttt gtcccatctc 169873897
aggacaggcc ccttccttct gccttgctcc acttggatga tgacggtgtt 169873947
acccttggta atctccccat cccttttgagc tgtggcctct gattccagcc 169873997
ctctgagatc ccgagccacc atatccatgg tcactggcat tctaagcagt 169874047
ttctctggtg attcctaagg gaagctgtca actttagatg gtaaaagcaa 169874097
ttcccaacag tgaggtatga aaatgcaggt cacccgccag gaaggataat 169874147
aatactagct caaatgactc tggcctccac ccagtgccag gcaccttgct 169874197
cggctctttc ctgtgttatt ttattaaccc caaccctgga ggacaagatg 169874247
ctattacagt tctcattttg cagttgagga acctgaggct ctaaaaaggg 169874297
aagtgcctta ctaagggtca tagagcttgg gaatcgcaga gcctggttct 169874347
ggttgatccc agaccctgag cttctaactg ccatactaac ctcctctcct 169874397
cctggctttg cctctggaac cttagggacc tgagtagaaa aacagtcaaa 169874447
acgggtgcat ggatgttggg gagaaggcat tcaaggatag actgaagcac 169874497
ctcattagcc acacggaaca actgagctac gtgcaggccc tgagcaaaat 169874547
gcttttagcc ccatcccaac cccgcctccc cctagatctg tttccatttc 169874597
atctgacact gtggaagcct gaatatgaaa tgattggggg cagaaggcca 169874647
attagcaaat tcattaatag gattaaacat ctctcctctg ctctaatcat 169874697

FIG. 1.61

ttatgtgaac taaaattttc tctctttgtt atagccatca ttgcctgtca 169874747
gtgaagatag agtgtttaaa tatcttccaa gtatgttaga attgcaaacg 169874797
ttcagaacca gggaccagga tcagagtttt cacacggtcc aggtgggcaa 169874847
ggagatcagt cggtttacaa gtggttatca ctgctaagaa aaaaacacaa 169874897
gaacttgcta gtacatttgc aagtacctta ctgctcatct cctttctctc 169874947
cttagccaca tgttggccca aatcacctgc gtatgttata cggttgttat 169874997
gagcatacac tcctggttag gcagacctag aattcaaatc ctggctctgc 169875047
aactcattag ctgtgtgaca ttgagcaggt tacctcgctt ctgtgaactt 169875097
tcatctctac ataatctaga aaatgaaagt attgttgata attccctccc 169875147
aggttgttat gaggattaaa tgcagtcatg catgtaagat gcagcggtca 169875197
gcactcagaa tgcgctaaag gtaaattgtt actatctggg tctactccac 169875247
ttaaagtgtg ctcctccaac caacagcctc agcatcagtt gggagcttgt 169875297
tagaaataca gagtcccggc caggcgcggt ggctcacgcc tgtaatccca 169875347
gcactttggg aggccgaggc tggcggatca tgaggtcagg agatagagac 169875397
catcccggct aacacggtga aaccccgtct ctactaaaaa tacaaaaaaa 169875447
ttagccaggc gtggtggcgg gcgcgtgtag tcccagctac tcgggaggtt 169875497
gaggcaggag aatggcgtga acccaggagg tggagcttgc agtgagccga 169875547
gatcgcgcca ctgcactcca gcctgggcga cagagcgaga ctccatcttg 169875597
gaaaaaaaaa aaaaacctca actcagtgag acctacccag tcagaacctg 169875647
cattttaaca agatcaccag atggtttata tgcccactgg agtctgagga 169875697
atactggcct aaagtacaga ttatggaact atgtgtattg tattacacaa 169875747
aattatatat caagccagaa gaggcttttg ctaagacttc tgatttaagc 169875797
ctcattttac aaataagaaa atagaatcca gagaaggtga gtggtttgcc 169875847
cacaatcaca cagctcaagt gttaggcctg acatccgaac cccagccctg 169875897
gtcatctcat ataaattgtt aagaagtcag atttccagat ttgcatttct 169875947
gcaatcaagc ttgtctgttt ttctttctct ctctttcttt ttaacaacaa 169875997
agaagtgcag gatgatgtac gcccattaag ttttagttta ctcattttaa 169876047
atgttattcc agccaacaga gatcctgaat cttgactcca ccagccatca 169876097
tcttagctgt acctccaagt tttctgctac ctgaagaaat gataaggagg 169876147
cattctaggt ctttatctaa gttgcttcta agaacatggg ccagaacagg 169876197
gtgcaggaca gagccatgtg gactgcaact agagacttgc ctgcataatg 169876247
gatttcactg ataatgttca gaatcccaga gcaggatggc agcctggttt 169876297
acatacagag cctttgtgtg ggatttgaag ccagaaaatg tgactaaagt 169876347
aggagtctaa acagacacag gtagggcctg gggaatgaaa gtcaaatgcc 169876397
ttttccaggg ggtctagtag gacctctctg ttggtgggga tcccccaaaa 169876447
aagtaatctt tttatttttg taggagtcct gtaatggttt cattattatt 169876497
ctcactttgc agagtaggaa acgtagatgc agggaggttc ttgattggct 169876547
agtgattagt aagcaaggac ttgaagtgga tctgattgcg aggcactcca 169876597
ccacctgggc tcctgcctgc agctggaggg catatccagg acaagcaagc 169876647
ctctgagccc caggaagagg ctgagcagtt acagctagtt tcccaactcc 169876697
caggaactga aaatgacagc ctcctcttgg ccccatcagc tcctcaccca 169876747
tgccaaccct ggacccagag tgagggatgt tctggtggag accatgaagc 169876797
tcccagctgc ctgggggaag ctggcacatt tgcatccgtg tggctgaggc 169876847
tgcactttct ctccatctct gggattcgcc catgtatgac tctcccagat 169876897
gtccaaattg tgcactcagc aggggtgtct tcaggaggct tccccaccca 169876947
tcgaaatcag ggcagcaagg ggctcccctt gtcttcttcc ctctttgcat 169876997
acatccagcc ctgggctgat taggactcta agccctgtag gccctgacac 169877047
taaaataatc aggtcctccc accactgccc cgccctgcct caccccacca 169877097
agggctacac aggcatttca aaggagaaac agtaaaataa gtttaaggaa 169877147
gtctgccaaa tttggatttt tcccatgttg actactttag tgacttttct 169877197
gaaataaaat gtgctttcaa aacacaattt ttgatgcctc tactttgcta 169877247
gtgctttaag catctcttga gtgtgcctgt gaggtatttc agcattggag 169877297

FIG. 1.62

ttggaaccag acaggaaaag gaaagaaacc gatctgtatc gggcacctgc 169877347
tgcatgccaa ggactgtgca aggtgttgac aaaataacaa cagtaacaaa 169877397
cataacattt aaatcgtcct tgtgacattt atatagcaat ctgtgccaag 169877447
taccactcta agcgctttcg gtacattaag ctaatttaat cctcacaaca 169877497
accctatgtg gtaggtagtg tgattattcc catgtaacag atgaaatctc 169877547
acactatgag agacaggcac tgatccccct attttataga tgaggaaact 169877597
gaggcttggg aagaagtgac ttgcccaagt gccccgatgc ctggtggaag 169877647
aacagtgttc acaccagctt tggccacttc caaagccctt gatgttgaca 169877697
ctccaaatgc aggcctcact catttcctag aagcgcctta tgatttgata 169877747
tgtcctcagg gtgcattata agaggaggga ggaaaacctg ggactacaat 169877797
gagcattgaa tcttgtcctg atcttctcag ggaccctctg tcattcccga 169877847
ttgcctattg catctgttct cacctggtac taccattccc tcctccctgg 169877897
tttttccctt gctaagtgac cactctatac gttggtccat atcatgtagc 169877947
ctctgctgga ggcaagtctg gttcccatct gccttcccct gaagaagaag 169877997
ctgctggaaa attagagtta tgttggacac agtctttgtc cccaaggaac 169878047
ttctctctgg tcataatcat tatattaaca gcaaacctat agcatgctat 169878097
gtgctagaca ctttagcaac ttggttttat gtaagcctta cagtatcccc 169878147
aggaagtgag cactattact agaccctttc cagatgagga cactgaagac 169878197
tagagggcat aagcaaatgt ccaatgtctc acttctcata agtggaaaag 169878247
ccaggattcg aacccagatg gtttgcctcc agtgcctgca tgctgaatca 169878297
ctggactagg ctggacctga gcatttagag gacattatag attatgtaac 169878347
actgtgggga ttcagaggat ggagaaagca cctctatctg aggggcaggg 169878397
gctggagaat tagagaagat ggccgaaaga ggcggcatta gagctcaaca 169878447
aaagagctag ggttggcccc aggcaagaat gtaggttagt gaagttctag 169878497
gcagaaggaa caggataagc aaagtcacag aggcaggcaa caagaagggg 169878547
aaagaaatga aaactgacag tgatgttttg tatgcttgtg acttggagga 169878597
tgttaacaga aagaggatgc catcagaagt gggaggcaag gagcagagtc 169878647
aggctgtcca tgttcaggag aatgggacaa ggtcctagga ggtagtagac 169878697
agcaaggatg aggaaagcac caagcaagta gggatcgaga ctgtgccctc 169878747
tcagcaccac ccttgtcccc ctaagtgtct ccccgtgatc actgcagctt 169878797
acatttgatt cctccttctc ctctcccagg gaacttacta tttgtcccca 169878847
tgatttagcc tttgattacc ttgaactgtt ctatcatcat tccctgtaaa 169878897
cacgcttgac tctccagcaa gagtgacctt tcctcagaga cctggacctt 169878947
tctttcttcc cttctcagca tcttcgagca tcccaggaca gtactgggca 169878997
aaagactggt acttggtgac ttgaactgat atttcacaga gatgcacaaa 169879047
gacttgggat tccttaatta gaattcatgc ggcagagaaa cttgggcatg 169879097
actttgagga tctcccccac ccgccaacag catattcaca agatacgaac 169879147
atcaaagatt gtggcttggt gtgaaaacat agcacattgg aggccattcc 169879197
ataacagctt agagctgatg aagagaaaaa gatatggtgt gttgggtgaa 169879247
atagaactga aggccagtcc tagcttaccg tttaggagct gtgtggtttg 169879297
aagaaattgt ttagcccctt tctgcatatc agcttcttca tctgttaaac 169879347
aataacaatc atggtatcaa ttcattggat tgtcatgagg attagtgaga 169879397
taatatgaat gtgtttagta agctataagg cagtgcatac gtggtgggga 169879447
tcagtattag atgacaataa tggtcatagc aataataatg attttgatag 169879497
tggtggtgat gatgtttgtg atggtggtgt gatggtggtg atggggatgg 169879547
tgttattcgt ggtggtaatt attatattat ggatgtgtga gtctgttttc 169879597
acactgctgt aaagaactac ctgagactgg gtaatttatg aagaaaagag 169879647
gcttaactga ctcacagttc tacaggcttt ccaggaggca tggctgggga 169879697
ggcctcagga aacttacaac tgtggcagaa ggctaaaggg gaagcaggca 169879747
tattttcaca tagtggtagg acagagagag agcaaagggg ggtgtgctac 169879797
atacttttaa acaaccagat ttcatgagaa ctccctcact atcacaagaa 169879847
cagcttgggg gaaactgccc ccatgatctg gtcacctccc accttgtccc 169879897

FIG. 1.63

tcccccaaca ttattaacta cagttcaaca tgggatttgg gtgaggacat 169879947
agaggcaaac catatcaagg gataatattg ttgatgatgg cagaggtgtt 169879997
ggtgacagta atgacagtag gggcttcatg gcaataatga tgatgatgat 169880047
ggaggattac aatattagtg gtaatggtga ttattatagt ataggtgatg 169880097
ttgattataa gggtggtggt ggtggtgaca atggtgatgg tggtagtgat 169880147
ggtgatgatg atgataatag taatgatggt gatatggtag tatgacagcg 169880197
atggtggtat ggtggtggtg gtgatgatag tgacggtggt gatgatggtg 169880247
atggtgatgg tagtagtgat ggtggtgatt atggaggtgg tgatggtgat 169880297
aatggtaatg atggtagtga tggtggtggt ggtagtgatg atggtgaagt 169880347
gatagtgatg gtggtggtta tggaggtggt gatggtgata atggtaatga 169880397
tggtagtgat ggtggtggtg gtagtgatga tggtgaagtg atagtgatgg 169880447
tagtggttat ggaggcggtg atggtgataa tggtaatgat ggtagtgacg 169880497
gtggtggtgg tagtgatgat ggtgaagtga tagtgatggt ggtggttatg 169880547
gaggtggtgg tgacgatagt gatggtggtg atgataatag taatgatggt 169880597
ggtgtggtca taatgatagt gatggtggtg gtgtggtggt agtgatagtt 169880647
gtgatgaaag gtggtgatgg tggcagtggt gatgatagca gtagggctga 169880697
tggtggtgac agtggtgatt atatagtgat gtaagtagta gtgttgttgg 169880747
aaggatgata gtggtagtgg tgtcaacagc actggtgaat ttaaggcaat 169880797
cattcccttt gtccaaacta tcttctttga ctaggctgca cagaaggatt 169880847
tccaaccccc agaacttgaa ttcccccagg tgtatttgtc aaaagtagga 169880897
aagaataaga caaatcagcc catgccttca gatttcttct cttattcctg 169880947
gttggtactt tcagaatcat tttaatgtaa gctgctttct tgacatttgc 169880997
attccagcac gtggcacagt gccatggctg gtacatcgtc aagtcttcaa 169881047
taaatatttg tgaaatgaag ggatgaactt gcagaaagac acaggctgtt 169881097
ctcttggatg aactcatcag agttaaatgt ttcatctttg aagataacgc 169881147
gggggttatc aggcacatca gaatatacct gcattaacac tattgccagc 169881197
atgagcaatt cgataacctg gcaggttggg aagatttctt ggcacctaca 169881247
ctgcccctgg aagcccccgg atgtcagctt ggcctggccc ttgtacccac 169881297
cactttgccc tcagaggtag ggtctgttct actgggattc tgtgctaact 169881347
gatcacaggg aacagtgggg aaaatggcct ctcccaccgg ctgcttctgg 169881397
agagtccaag cctccctcct cagtgacctt gctgtgcggc aggaatgaga 169881447
ggcacatcct ggctctggag atgttcttct tggcagcaag tcctccccaa 169881497
tggcaggagg gattacagaa gtgatttcag gtgccagtgc ctccacagcc 169881547
cacccaccct ctgctctagg caagtcagag gcacctgtag agcctctgtt 169881597
ctttgtgtgt ggaaaaggaa taatctcgca ccagcattat aaggttctca 169881647
tggtttttag gggtgtggca tatagtgagg gctccgctaa tggcagcagc 169881697
tattaatatt ggtatcattt attatttcca ttactagtgg agacattgag 169881747
ctgatatatg ggtcaataat gatagactag agactttgtg tgtctctttg 169881797
gtggaacatg tgtggcttgg attcaccttg aatcccctga ttctggcact 169881847
ctggcctgag agtgtcctct gaatgagtca tgtggtgcca gcggggttgt 169881897
tgagatagat agatggcctg caggcatttg ggttcaaatg ctgttctgct 169881947
gaataaggaa tacgatttgg ggaccaaaca cccttggatt taaatcccag 169881997
acttgttttt ccctggtggt gtggccctag ggaagtattt ctgctgagcc 169882047
ttactgtctt cttgtgtcca gtaaggttag taatattgac cacattggct 169882097
ctttgggaag aggatggaaa ataaagtgta aatggagcga gggagggaat 169882147
ttgtctccga ggcagcacag gacaggaggt aatggaaaga ccaaagtggt 169882197
ttttggatta gagctgcctg cagcctttat ctgtctatgg agttgattta 169882247
ttattctccc aaatcttgga acaaagtcaa gaaagggagg aaggaaggga 169882297
gagagatggg taataagagt atggaagaaa atgtaaacat gtagagtgca 169882347
gacagcggct gcctgcccat agcaagccct ccgcagaggg agaattaatt 169882397
ggctgttgtc atttgtattg ttgtgattgt tcttattgtt gaaagatgta 169882447
gaagagaaat caggtagaaa gaattcaagc aaagacaggg ggtgagcgaa 169882497

FIG. 1.64

agcatgaaga aatgaacaga atctgggctg aatttcttta aggttataaa 169882547
gcactctatg caatctgagg caggcagtcc ccaagcttct agtaccaccc 169882597
tgcgactcta cgtgtcaaac aggaggagtt ccttaaaggg tgtttggtgt 169882647
gtgcatgtgt gtagagggat gaagcatgta tacctctttg tatacatcag 169882697
acactgtgct gggcactgcc cttaaattat ctcacttaat tgtcacacag 169882747
tcctatgaag cagatgctgt tattgtctca gttttagaga caagaaaact 169882797
gaagctcaga gaaaagaagt gatgaccagc ccaaggtcac atagctgcta 169882847
agtgcaggga cagcatcaga acccaggccc gtctgtgccc ttaggtctca 169882897
gagattctac acctactacc tagtattagc tcaatctgac ccttggggaa 169882947
attaagcccc aggaaagctg tttccttcag ttgcgcagcc aacttgaagc 169882997
aatggtagac tgaatcccag ttctgactgc cagctccaca gtccctccct 169883047
ggggcctcgc acatcattgg aactgacaac acaagaatct tccatctcct 169883097
tccttctctt cctccttttc ttggctgtca tccaaaactt taggggaatg 169883147
cattataaac caacttgaga gacagagaaa ggctgtagga agatccaact 169883197
caaaaacatt ttggtgtttg ctttacctcc gcctgagcgt ccctggagat 169883247
aaaccctcct cactctcgcc caccattgct ctgctatgtc aatttcagca 169883297
gccggactct ggggctgaca tgcattgccc cttctcaacc cagacaccac 169883347
ttccttcagg gaaggctcca cataatggtg aagtgcacag actcagaagc 169883397
cggcagtgc tgttcagaac ctggttctgc ctttctcggg cgtgtggcct 169883447
tggataagtc atctactctc tatgagcctc agatccttcg tctgcaaaac 169883497
agagctaatg cctcccttct tgggttgctg tggggcttaa ttgagaaggt 169883547
atatgtgaaa tgcctgctcc ataatagaca cccgtttgag aattaacgtt 169883597
tgggttgtta cagtgtgagc ccatgggtct caggcaacag acttgataaa 169883647
tacaggttcc tctgcaacca caatcctagt ccttagcaca agcatgacac 169883697
tgcctggcat gtgctatccc tcccatatcc atcagccatg gcagacacag 169883747
atccctcatt atgagacttt tttattctga gctagaatgt gacctcagaa 169883797
tctttcttaa cacaatgctt caagcagtca ctaccagttg aacatagttg 169883847
acatggaaga tagatgaagt ttatttgcat tctagttctc accaagtcca 169883897
tgttcactgc tccatctgct cagtgcaggc tgtctctctg ctctgtctcc 169883947
cacctgcttt tgtgagtgta tgtttctatg tttgtgtata tgtgtgttta 169883997
aactcctctt ccagagtgaa agaccatttc agtcttttgt gtgctgattt 169884047
gtagaaatca ttgaactttc agaatcccat ttgcaatgtc atgtctgtgg 169884097
ctggggatct ccaagtaaca tcagcttacg tctgggaagg acaaggggaa 169884147
tcaaagttag aagtcaggag agcaaaatcc acacacagca tgcaccatcg 169884197
gccaccttta ggagtgacac aagagatggt gtttgaatat aaatttgaag 169884247
tctttccaaa gatttaacac tcctttggct gacaaccata atctcaagga 169884297
ggtaggccta ggctagagca attatacttt agggtaaccc tagctgctat 169884347
aacaaataaa ccccaatatt gcagtaggct gaaacataga attgttttta 169884397
tcattcatat aacttcttga tgggccagta gccttcttcc atgtagtcac 169884447
tcagggacct agcctccttc catcttgttg ctccccccaac cctaaggcat 169884497
cctctacatc taggtgaaag gggagcagaa aatgtggtct ctggcccagg 169884547
aacaactcta gtcttggaga agcacatgat atagtatgga gatcacagcc 169884597
aggcctgcca ccggcagcaa ttcagggctg ggcaccagat cagctgggtg 169884647
gagtcccagc tggccaagga gtctgagccc aggtactatg tggtcatctt 169884697
gggcatggaa cagggcagct caaggaccag aggtcagctg gcagggtccg 169884747
caccaagcct atccagggaa gccctgccct gatcatggac aaggcctgtg 169884797
taatcctgat gtcagctgct tccctcccga ggacagcctg cagcagatgg 169884847
tcagagcctg ttgccattaa acatttgagt ggttccacca gcatcccgat 169884897
gagtctgggt tcaccaagaa acattattgt aatgtgctcc ccaggcagct 169884947
ctgcctcagg gagagacaat gccaggcatg acaacttcag cattcttgtt 169884997
ctgcatggca gttgcatttc tcattgtggt ttatatgttg gtcacatgat 169885047
ctgagctaat gggagtattc gcctgacaga tgagtccctt ttgctgggtg 169885097

FIG. 1.65

tgccagcaaa atcaggcttc caagcccccca aggctcactg ccagaggctg 169885147
gggaattcgc caaggtaaat gccaccttgt gaggtctttg ggacacagcc 169885197
agcagcctcc ccagggcacc attcctgtct cagcatgagg cttctctggc 169885247
cagcccaatg gcatttggga gccacatcca caccccacgg gtctgggtct 169885297
gtttccagct gcactgggac attctggcag attctccctg atctctgtaa 169885347
ggaagagtac agcaggaagg agaggaagca gaaaaaaatt ccaatgctta 169885397
gagttttccc tctaaagagg acctcctgag ccacttctga acaggacttg 169885447
gaacaaagga atcttggcgc tttgatgatc gtgtctgcag cagttgttga 169885497
aatgagtctg acactcgcca gtgccttagt aggaattata attacatcag 169885547
gagaccccag gcaaccaagt aaactgatta gctactgctc cgagttgata 169885597
gatttttttc tctctaggtc ataaataggg ctgtgggaga tggtggaagc 169885647
atgctggtgg gaacaggtcg agatgggctg tacattcagg aagcccaacc 169885697
aagtggtgtg ggcagctccc cctgccccac cctgccaccg gaagagacag 169885747
tctgacaggt gcccaaggta gagttcagtt ccctcggcca gggactgcac 169885797
tcctgatctt gcgtgctgca gagagctgtc ctcagagcag gctgagggtg 169885847
gctgaactgc taggcgatgc tctgggaagc cctccgccag gaaagccgat 169885897
gctttctgcc aggcataatt attgcatgga taattacacg attcagagcc 169885947
tgctggagaa tcctgggctg gtgccagagt agaaaggcag ggttccggaa 169885997
ctgcagccag tggctgattc tcagagtcga ctttgaaaga agagggtaat 169886047
cattcctcct cctaagactc ctacctggct gggccaggac atggcaaacg 169886097
taaagctaag ggaggcgggg agttgatgag ttctctcctc cacccactcc 169886147
cttacaggag ggggtcccca gagttctgac ctaatccctc ttctttactc 169886197
cctgcacgtg tcacctccct gggacaatcc accccctgccc attagcacat 169886247
atatgcggat gacaccaagt gtctttccag ccaggcatct gcaaatgcat 169886297
gctgggcatc tccctcacgt gtctcctcca gcccattgca ctccagcctg 169886347
agccattctc ctcctacccc agtctgcctc tcagtccata ttctcttccc 169886397
agccagacat acctaacctc ccagacctcc actaggaacc caggagtcct 169886447
aacctgctag tcctttccca ctccctgtgc accatccgaa gccaggtcat 169886497
gtcagttcta cagcagatgt gtcttggctc ctgcctgttc tcccagcacc 169886547
acccccccagt cctccggcac agcccaggtc tgggctccat ggtctgccct 169886597
ggctttcttg tggtggcctc ctccctggcc tccccaccct catcccctgg 169886647
ggaccagcct cccactgcct ccagatccaa tgtcttccag taaatctgtc 169886697
tacacattcc caaggttgga gtccttccat ggtttccttc actctcagca 169886747
ccaacttggc cccttctgac tgtcctgaag acccttccca agctgccaac 169886797
gctccagcac tgcatcccct gccctgcttg tgacacccaa ccctatcaga 169886847
tgccacatgc acttctccca gttgtccaat gtggctttgc caagcctgag 169886897
catacatgtg tggaagggag gaatgcaagg gtgaatgttc tggactctgg 169886947
agctacactg tgtgggtttc aatcttagct ctgtcacttg ctagctgtgt 169886997
gacccaggac aagtcacttg gcccctctgt tattctttct tcccatctat 169887047
aatgtagaaa taatagtaat aacagaaccc atccatgggg ttgttgggag 169887097
gattcaatga catattcatg taaaagactc agagcatgac cagtgcacag 169887147
tggccatctt atcaagtgcc tgctgcctgt cccaagatgg aaacacaaaa 169887197
tgtgaaatcc aagtgtgggt ggtggagggg tggtatgggg cggggcggga 169887247
attcagttta aactagttca tgccttcatt ttacagaggg agaaacaggt 169887297
cctgagagag gagggacctt acccatggcc accccaggac ccagcccagt 169887347
gttcttggtt ctgaggcccg gctgccctgg catggagcag acagctccct 169887397
ctgggtggtc aagttccctg agttctttga gggctgacta gtggtgagag 169887447
ggattcctcc ccaccaaacc cctgactctg agaagtgggt tggagcagga 169887497
gaagaaaagt gtgcaactca gctcagcttt ccagggtaaa ccgatgagag 169887547
gacatttgac ggtggcagcg ttaggagggg acttctgcac aaggccgggg 169887597
aaactttgcc taagatttag gccctgggct cagcctgatg caccccattt 169887647
actgggtgcc tgctctgaga ccaggatacg tggaaagaac ccacgcctgg 169887697

FIG. 1.66

```
gagccagctg tcctgggctt tggaaatagc tgtgtccgta ggtgagacct 169887747
tgtctctgca ggcctctagc agaggggcta agagcatgcg ctctgcaggc 169887797
tgcctgggtc ctcacccta ctcccgcact tagtagccct tggtgactta 169887847
accttcctga gcctcagttt tctcttctgt aaatggaaga tcataatgat 169887897
acctgcccca tagagttgtg tggataagcg atagaatctg cattaaagca 169887947
tttaggtagt gcctgagatt tagcaaaggc tcaatcaaca tttaaaaatg 169887997
gcaagaacca agcactatca tgcaggtagg gcacccatct ttgtgcataa 169888047
tccctttgcc ttccctccct agaatgcaga ggaaggaaga cctctgtgag 169888097
aaccctacat acatctttgc caattggcag tttttcctct agttaatttg 169888147
ggagcctgtg acctttaccg ccgtgtgatt ctctgactca gactgcagtg 169888197
ttgcagtgcc agccaaacat ggtgacaagc cccttcccag gcaactgagg 169888247
acaggcagga gtgttctgga atcttctcct ggagtgggag taagggtggg 169888297
cagagccatg tgatgctgca ctgtccacct ggttgaagga agtaattcca 169888347
gactctgtct ctgacatctc tattagccaa gggtgagggt gttagttcgg 169888397
gtcatgttag ctgcgcctcc caccctgcat cctgggccca gaaaccacac 169888447
ccctgtgcag ggcttctgtg tcagagtcac cagggaaatg ggctgctgag 169888497
gatgccagca ccaaccaggc tgctgtcctg gggcgacatg tctgccatct 169888547
tacaacctcc cttccaatat tcaccatgtg ccagctccag ctcagtcact 169888597
gagcctcaca tcgctggacc ccactgtgtg ctcagggtca tcaggcactt 169888647
tcgcctgtgg ctgggattga gacctggctc ctccaccttg cacttgtgtg 169888697
acctggccat gctcatgtca ccctcctggg caccccaata ccctcatttg 169888747
taaagttcaa cctacatgct gtgactgtga agtgagaaag cagtcagcag 169888797
tgcttagaac agtgcctggc tcctactaca cactcaataa tgccagctat 169888847
gttgtcaata tcaactctac gcagtagccc atttctgtag atgaagaaag 169888897
ggaggctaca ggaagggaag gcatgtgcct ggggtggatt cgaactcagg 169888947
cctgtcgggt tccagtctgg gcttttctgc tctttccagg ccatattgga 169888997
actgccatta gagggactca ttcattccca tacatgtcaa atatgcactg 169889047
cacccagatt acatccatct ttaattgaag acctatcctt ctgggctttg 169889097
gagatttgct ggacttgggg agtcaccaat acaactcagg tagtgacatc 169889147
tgggaggaga agactgaggt gtcatcagct gcttcttatc cccctgcctt 169889197
tgctcagcct gtccccactg atgggacacc tttgcccaac ctctcaccca 169889247
taccttttat ctgattagct tttttttttt tttttttttt gagacagaat 169889297
cgcgctctgt tgcccaggct ggaatgcagt ggcgcgatct cagctcaggg 169889347
caacctccac ctaccaggtt ccagtgattc tcctgcctca gcctcccaag 169889397
tagctgggat tacaggtgcc tgccaccaca cccggctaat ttttgtattt 169889447
ttagtagaca tgggctttca ccatgttggc caggctggtc ttgaattcct 169889497
gacctcaggt gatctgccca cttctgcctc ccaaagttct gggattacag 169889547
gtgtgagcca ccgcacccgg cctgattagt tgcttcttcc tgtcctttgg 169889597
gacctggtac aggcatcacc ttctctggga tgcttccctt gtccctccct 169889647
catcacaagg ctggcttggg tgacctttct ccatgctcca aaactccctt 169889697
gctcctaagc agccccagca tggagctcca agccatgaag ctctaatatc 169889747
agagtccaag ccttatagag cttccagggt ctgacacatg gcagaagtta 169889797
aattaaacta tgtatttgtt tatttgctaa cattctgcct tattacaaaa 169889847
gagacttgag tcaactaagc aaataaatgt ttgcagagct gaattaaact 169889897
gagacagggt actggcccag tagaaaagta gaaaatacct gggcttgggc 169889947
atcaggaaga cctgggtgag aattctccag acctgtgcct tctatggaac 169889997
attaaaaagg tcactttccc tctcaaagcc tcagttagct cttcagggcc 169890047
tgcgaacggc aatctattgt gaggacctgg tgtgtgagcc aagtgcaccc 169890097
atcagccact cacagctgca gcagaaccag gcagttgagt ttgacattgg 169890147
ccttttaagc tagtcacgaa taatcagaag acccatggca ggctgtcact 169890197
agtgattttg cttaggtaca aacttgaatg gtgctccttg gagttctgat 169890247
gtgggagagt cactgagctg gacgttagca cacacagtta cacgctcaca 169890297
```

FIG. 1.67

```
ggctcacccc agcatgcatg tctcaaaaca atatattttc ctctatttgt 169890347
ccttgggttt tcagttacag caaaagtatt ttcaaaacaa aacaaaatgc 169890397
atcatgatac aatctcatat caagtaacat tcatttgggg ggacgcactt 169890447
aaattaatag tttcataagc ggttgttgtc ctgcatttac agacacacga 169890497
caattctgaa ggggtcatgt tatttttcga ttatccttta ctgcatttta 169890547
tgtgggacat ggcatgctgc agtggtgttt gtgagctgga ggatttggga 169890597
gagccttagg aaccctccca ggagcctcaa ggattgactg cagtaggagc 169890647
tcaaatgagt tttgcctggg gcctgccctg gaggagacct gcctctcagc 169890697
agccaatccc acccaggctg ctctggaact ggaggctctg gctcactggg 169890747
ccctgctccc cacccacttc cctctcgcct ctcccattcc cttccccagt 169890797
ctgcagcccc tttgttcaag gagggagctg caagcgggtg gtctctgggc 169890847
agctggataa ctacttctaa agcctcttag accctggtaa tcttcctcct 169890897
aacaccatcg ggtgactgca aagcactgca ggccagactt cagttctgct 169890947
gtgtaatttg caagctgggt gaccttcctt atctatagaa tgggctctcc 169890997
tgcatggctg gcatgaggaa taaacaaaat ggttgtgtcc agtgcctggg 169891047
gcatagcaca gctcaaaaaa cttagttcat cctcctgagg gatcaagaag 169891097
atacttggaa acaaatgtcc aagggcgtaa tcttgaaggg gcttgtgcca 169891147
ggcatatatg gagagaaggg ttttgtggga tgtcagactt aatagtgccc 169891197
tttactcccc acccccgtct ctctgttcat agacaggaaa tctgtggcct 169891247
attctgggac ctcaaagtgc cacagggtta aagataccaa gtcagaaatc 169891297
taaggttcta aatggacttt agaccatttt tcatttggga aggaagaatt 169891347
ctttaagggg ttgtgctggc gctgtctctg tatgcatgtg cagaatgtgc 169891397
ttccagatgg ggtaatggtc tgagtttgag gacagaagtc cactccactg 169891447
cattcaactg ttcaatagtc ctgggcagtg ttattgcatg ggagaccata 169891497
cctaacccca aagattgccc catagtctct ttgtcagata aagcataagt 169891547
gagcatccca tctttgttag tcagaacctt ttcagtttca aacaacagaa 169891597
aaccaactct tcctgtttaa aggaagaaaa gggggggtta ttggttcatg 169891647
taataaaatg gccagggtaa gattaacttc aggcagagct gaatacaggt 169891697
gctcaaagaa aatgtcgaca agaacctgtt gatttctctg tctcagctct 169891747
gctctcttct gtcttggctt cattctcagg aaatgctcta accttggggt 169891797
tccaagagta gtcaccagca gccccatatt tacagcccac cagctcagca 169891847
acctctgtgg gaaagagctt ctcaatagtt ccaggaaaag tcccagggct 169891897
ggctcccatt ggcctagata gggttctgtg ttatgctgtg aggtgctggt 169891947
tctggggacg gaggagtgtt ctgccttaac aaccgaatgg actgtatttg 169891997
tggggaggtg tgggaaacca aggagctctt accaggagaa tggatgttgg 169892047
gccagcagaa acaaaatatg ttactgcctt cttcaagtac acaggtttct 169892097
gtaaagccta acatcacact gaggcaccac ttgccccaaa ctccagcctg 169892147
aaggattatg aggagttcga gcttgccttt gcagggcgcc tgcttcctgt 169892197
taggactgtg ctcattgtac atggaccttc ttctgaacct ctgagattgg 169892247
ttctgttatc tttattccca ttttacagat agccaaccac aaacttactg 169892297
ggtggagtaa cagtgttgcc cagagttaga gcttataaat ggcagagttg 169892347
gagtttggac ctatattaaa cagtctaact tcacagggca gactcttagc 169892397
catcaagcaa tatggtcttc cccgagaatg tctccccact tcacccttcc 169892447
aggcctttct tcttgttgga ctctagactt taaatgccct tctttttact 169892497
tcctgctcac ttattaaact cttccttgaa tgctcctcct cctgatagtt 169892547
ttccccagga ttaaatctga gcaagaccct tttctacaag accaaggtca 169892597
ccatgccact gctgactaca gctggtgtat ttgtttgtcc taacccttgg 169892647
agggcagaga ctaaatttat tgtttaccac tctggcacct agtacactgc 169892697
ctggcacaga gtaggtgctc atggctcata acatgtttat tgattgttta 169892747
gatggcaaca cagataaaat caaaacatgg aaggttgctg agactcaaag 169892797
acaggattat tattgttggt aatgatctga tagctaatga gtattatatt 169892847
aataatagtc aacatgtcag gtactataat agaggctttg cgtaactgct 169892897
```

FIG. 1.68

```
cctttttagtc ctcccagtaa tactatgatg ctgatattac tcttcccatt 169892947
ttgtagataa agaaactggg agtcaaggag gtgaaatggc tttcccaaag 169892997
tcttgcatat aatgtatccg gactgcaagg atggggccct ctggccccct 169893047
caacacccta tctgcctctc atacccaggg acctgcccac aaggtcagcc 169893097
ccttggcaat cttgccaacc ttggggctca aaattcagtt tatggcttcc 169893147
caagatctac tggatgcttt ttctaagttt ggagaattca tgacattatg 169893197
aatccttttt ccccaaggtg ggtattcaaa ctcagagttc cagccacgct 169893247
tgcatccagg gctcagatag cagagggacc tgcctgaggc ttgatttaga 169893297
agggtccacc tgaggatgtg gatgaagcgt gaattcattt ctggcagggg 169893347
tggcagcaga ggcagacagc tctgtggagg cagaggtggg gaaattctgg 169893397
tgtctccttc ctagtgtgga ccatcgcgcc tgtgttgagc agtggagata 169893447
gtggggtctt tcctgcagag gcctccatgg tagggctcaa acattgttct 169893497
agctggggtg gcctccaagc ctaatacctt gaccctcttc gagattctct 169893547
gcactgccaa atatcttcta ataaattcct tctctgcata aaccaactag 169893597
aatagattct gtagtttaca accaagaatc ctgactgaaa cccccctgaag 169893647
cttgtgggtt taggtatgac catgtgggaa ggcagcatga gctctggact 169893697
ataaagagaa tcagttgagg atgtggcagc aaacaggtat actaggggat 169893747
caacgagggg aattattatg atgatgggcc tttggaaacc tctgccttct 169893797
acagcagtac tttgaaactc ttgtgcacac agatcaccta aggatgttgt 169893847
tagcatgcaa attctgattc aggagtttgg ggctgggacc tgggatcctg 169893897
catttccaat acccttctcc acttaagttt tgctgatgct ggtagtctga 169893947
ggaccaccaa tgaggtggtg aggttccagg gacgcttaag cctccagcaa 169893997
aacatcacac aagacagaag tgcctacttc aattgcatga gataatgaga 169894047
ccaaatcatc cccgggcaag cccaccacta acaattattc ccatcattgg 169894097
taacatccta agtcctaagg tacctggagc ttcaaatctc ataattagca 169894147
ctcttgttat gccaagcctg ctcctaatga ggacactttg ataattcgct 169894197
ttgttgaaga aacaggatct gttcctttcc cctacagtac agcatgatag 169894247
gagtgtggtt tgctatttgt acctgtaact cagcccaggg agtgctgaca 169894297
atgggggagc cactgcagga gtcccagcct ccccacctca tgccccaccc 169894347
cctgtcctaa gccccaccct tcccagcaaa ggaaagtagg cccctgaagc 169894397
agttgtcctg tcctctagaa tcctctagaa tccagctaca aacatccaag 169894447
tcctgccccc atcttcccga tctaactcac accatttgtc atagtgacct 169894497
ggcctcagcc tctttcaact tcttctctca ctgccacacc tttgcgtagg 169894547
cagctctcca gcctggaata ccctcttatc catccggcca actcctccat 169894597
gacctctgag atccatgtgg aaggctctag aaagccttcc tcaaatttcc 169894647
tttgttccag gatttaagct gacctaaatc ctagagatta gtacttcatt 169894697
ttcaaacttt tcatttgctc aaagcctaca gcaaactcag tccacacact 169894747
tggctataca agaaaggttg ctttctttgt tgttctataa ctgactttaa 169894797
tttcaacttc aagtccccat tcttgccaag gggtagaaat ggaatcttgg 169894847
tcaacttagg ttcccctccc tactctctgg ggttgcattt ccaggccagg 169894897
cagtttctgc tggtgctttt gttccttggt cctcagtctt ctttctgtgt 169894947
tgacatccat tgacatgtcc tcgactcccc tcatctcaga tcacaggccc 169894997
atgctgactc caggagtatt cttgtattct cttcatctga acctcaacac 169895047
tttttgagac cacgcatgca tgtgctctct ctttctctct ctctctaaca 169895097
cttctggaac actcttggac atgaggagat attggtcttt ctaggatggg 169895147
gtcaactggc cctgcctcag atccattggc ctgtacatat cttgtagcca 169895197
ttgtggtgcc atggatcaca ggtcacgatg ctgtgtggct gcctctgctc 169895247
ttagacctgc cccccatgcc accagaggga gtgtctgcct ccccctgccc 169895297
tggacactca gctggagggg agggtcacag tccctcacag tcccttctcc 169895347
agtgacaagc aacaaactcc cagtcttcct ttctttctga tcctctcctc 169895397
ctcttcctcc ttctcctctt cctcctctcc cagtccaagg aagttttatg 169895447
caaaggccag aggagggaat aatgaggtgg aggtctctct gaccaagcat 169895497
```

FIG. 1.69

```
gtagccttcc ggatctgttg tgctttccag gagtccttca aagctctaag 169895547
cttttggaat tctgcaagct caggaaattg aaaacctttt ctctcacaac 169895597
tgcaggtctt tgtctgcagt tgtaaaagtc tgtttagaaa ctcaggagac 169895647
aagcagcatc ttctttgttc cctgctttct ggaggcagtc agcgtggaac 169895697
accctgcctg cagtctgact cagggaaagg gtcactgagt gtgtgtgtgt 169895747
gtgttgaggg gtggataata agcaaggaga acactcagac agagagctca 169895797
cagaggggca ccccagcacc tccctcacct ctatattccc cgcctgggca 169895847
tagtggaggg agggttaatg ccagccaagt ttaacaggca tttctgattc 169895897
gcggcattgt tgttgcgcta tcctgcaatc ctacgctgcg ggtactgttt 169895947
ttatcctgat ccttcagctc tggaaactaa tatagagagc tgagtaactt 169895997
gcttgaggcc atgatgccag gatccacggt gcccccaggc tgaagagcct 169896047
taaccactgg gctgtaccac ctcacaggag ggcaggtggc acagtgcctg 169896097
gaacttggga gggtccagca cgtggaacta tgctctgtca tttacttact 169896147
gtgtgtcact ggatcagtca ctcaacaccg ctaagcctca ttttccacct 169896197
cttcaaaagg gatctaataa acctgttagc agaaggctgc tgtgaacact 169896247
aaatgaggtg gcttaggtga gagctctggt ctgaagatgc tcacactttg 169896297
aatctcaaga cttgtgtgaa ccaatatcag atttctccta ttagattgca 169896347
attctcaggg agtcacattc cgtctccaaa tgcccatctc ctgatccaca 169896397
aaatgagcac aacatctctg ataaacggta actagatggt tccagtgggc 169896447
agcgggagtg ggagggcggt tgactgggcc agaacctcaa atgtattcct 169896497
gtgtagtttc tcatgcattc attcagtttg gcaccagaag gtgcccagac 169896547
tcactttgca gccagtctgt ccccatagag gtgataaagg aaaaacatat 169896597
gcacatttaa acttttaaaa gtttatttga acattcagcg attcacaaac 169896647
ggtatagcac agacagcaag caactagcac tcctctagga ggggccaaac 169896697
aggatacttt tataaagagg ttgcagaagc aagacaaaga aaaccatttt 169896747
aatgggttgg aatggaaagt tcctaattag aggttcattg gtggctcctg 169896797
attggtgcag cttctagttt caacttactg tttacattgg tctgtggttt 169896847
gtccccatag gaacgtaagg tgtcagagcc agctactcag gagaatgagg 169896897
tgaaaggatc acctgagcag ggtaggtgga ggctgtggta agcagtgatt 169896947
gcaccactgt actccaacgt gggcaacaga gtgagaccct taaaaaaaga 169896997
aggaagagag ggagagggag aaggaggagg aggaggagga ggaggaggag 169897047
aaggaggaga aggagaagaa ggagaaggag gtggcagagc tacagaagca 169897097
cctgttgccc aggatggagt gcagtgatgt gaccacagct cactgcaacc 169897147
ttgatttcct gggctcaagt gattcccccc acctcaacct cccaagtagc 169897197
tgggaccaca ggcaggcacc accatgccca gctaattttt ttttattttt 169897247
tgtagaaatg gggtctcat tatgttcccc aggctggtct tgaactcctg 169897297
ggctcaagtg atcctcccac cagagcctct caaagtgctg ggattaccag 169897347
catgagctac cataccatgc ccggcataga tttttttttt tttttaacag 169897397
aggctacaga caagactgac tgcctggcct agagttgagg cccgggagac 169897447
ttgcctcctg tgtgcagcgg gctgtgctgg ttgcctcggt ttcccagagt 169897497
ctgatgaaca tgtttcctcc acaggcagta gctgcttcat ttgtttttct 169897547
cccagttttc atttctcatt agctgctaaa tcctccccat ggctgcagac 169897597
cctattgtag ctgactcagc cagtgggcac agcaggggct gggtcccagc 169897647
gccgtctccg caacctagga gaggtcaggg gcagcagtgc ctgcctggct 169897697
ctatctccaa gtgtgcctca cccccactga caggtcagat tatccactgt 169897747
ccccagagac gttaggaggg aggccgtgtc ctccactccc ctagctgaca 169897797
cactggaagg acgttctcct tgacatctga cttaatgaca gtggaaccaa 169897847
gcggggtgcc cttgggtgaa ggaaaaagga gggaagactt gagccttctt 169897897
taatgtcaat accctgagcc tgaggccaca agcaaaggcc agcagcttct 169897947
gcaggatagc agaagccagg agacagggaa ctggggagtg tacatttatt 169897997
tgcttctcca acaacaacaa caatatctag gtgtgcagtg agctcccact 169898047
tctgctgatg tgggactaga caaaagatga gaggggacca ccctcagagg 169898097
```

FIG. 1.70

ctccctcctg cttggcccca aactctttgt aaatccagca ccccaccccc 169898147
agttgttccc cttcaggaat catcaccctc tgaaaacctg cagaaattct 169898197
caaatcccag ccccctttgc ttctcacact tgtagaggtc tttccctaag 169898247
caaacacctg ctttgattat tcagggagtg agaattaata tcattgtaaa 169898297
tctaactcaa acataattaa gaagttaaat ctacttttga gggaaaaagt 169898347
tctgattgct catctccaga ccagataaat aagatttcaa atctccaaga 169898397
tctgcagctc ggtgtgaact gccctccgcc tgtctcagcc agaacatcaa 169898447
gtggaaaggg gcctgaggaa ctgcctcctc cagccccacc agtgtggaga 169898497
tgcagctcag tcttgccatc tgtgaaatgg gattgataat acctacatgg 169898547
ttgtcttgag tttagctcat aacccttctt ccgccagaat atcaactccg 169898597
taaaggcagg atttgtttg ttccccatag tatccccagt gcctcacaca 169898647
tggtaagcat ttaataaaaa caaagccatc aatggagatg acgaaaccca 169898697
gagagcagca gtgccttgac cggggtcaca cagcaagtta gagcagagcc 169898747
ctgattgaaa ccaagggctc ctgggcctta aactaggcgc tccttgcatt 169898797
agcctgtggc aggagatgta ggtttgctgt caatccttcc accagttact 169898847
actgcctgtg cagccttgtg catgaccttg ctttccctgg gcctcagttt 169898897
tcccagcagt agaatgggct tattattaga ggagaagacc acatccactt 169898947
tggaaaacgg gcagaacctt gtcccacctt cccccaacag ctgaccattt 169898997
tctgcccagg ctgtggccag aacctgttct ctcccatcat taaaatccct 169899047
ctctccttct ccaactcttt ctttctagct ccaccctccc caaagaggaa 169899097
acaaaggaag gcaaacatat tcctgttacc agcccaggtc tcagtgggcc 169899147
aaggtggagt gaggggaggg aagaggctac agtcctccca ctctgccccc 169899197
acacacctgc agagacatta aggaaagcgg agctaccctg ggctgcctct 169899247
ctgtgattta acgctctctc actcccacac ctgcagtgca ccggagttaa 169899297
aaatgacctt ggcaaacagc cttatgtatt ctctgtctag agcagaggac 169899347
agagtcaaag aaaacccact cagaagcctg gagagcggct gaaagtgggg 169899397
gagggcagga aaggagggag gcaggatgga agcatgcatc tcctgggcat 169899447
tagacttgct ggattaagga gtggagagtc aaacatgggt agctctgctc 169899497
agaaaaatta ttactgaagg agagattatg ctccacaatc tcaccagaat 169899547
gtggctttgc aaagtgaaac gagggttcgt tcctctgcca gcacgaccaa 169899597
ctctcccggg acacccccctc aggtccgtcc ttgtgccaca ggccacctca 169899647
cttcaggttg gtggctcaga gaggtagcag ctcccatcta aatgtggctt 169899697
ctagaacctt ctcttctcct gctgagaaag gattgtgctg agtagtagaa 169899747
gcagctggca gtggagtccc ctggcctggt tcctacaatc ccaactttga 169899797
caattgtgtg acctcggaca agtcacctta cccatctaag cacatgttgt 169899847
tttaactgta aaatgaggaa aatagcattc aactcagggt atgaatgagt 169899897
ggagccatgt ggagcaacag ttaagggcat ggacttggga gtcaggcagc 169899947
caaggtctgt gattctaggc aagtgatgtc accactgagc ctcagtttct 169899997
ccacctgtca tacaggcagg agtaaatgcc tcctcacccc ctttgttcct 169900047
tgtacaaacc cttgccctgg atgttctgtt tgtcctcagg accccctctc 169900097
cactgttggc tggggaggct gacctgggag gactctgtga atgaggcccc 169900147
tgccttccga cttcagctgt tcatgacaca ggcggagact gcgggcagga 169900197
ggagagtgac acgaggtgtc aactcccagg ctccctccct gagggttata 169900247
gggcatggct ctcttccata gctttctttg ctcggccttt tgttgatggt 169900297
tttcctcatt catcaaattg gggtgctgag ggcacccact gcttctgtcc 169900347
cagggcactg ccctcttcgt gtgctttccc actctctccc tacaccactg 169900397
tacacagtcc ttttgttaca cggccttcca attccccaat ctgagggtgc 169900447
cattgtgtcc agctgagacc ctgaatgaag caactgtccc gtctggccac 169900497
agacctggca caatttccct tcaggcactt aaagcaggag taatgaacac 169900547
tgatgagttc agctcagtgc taatccctct acatgtgaaa tctcagttct 169900597
tcagagagcc ctgggaggaa gctactacag cctttcccat tttaaagatg 169900647
agaaaactga ggctctgaga aggtttcaca gccagagcta agcctagagc 169900697

```
ccttaatgac tatcctcatg ccctctccag tataggcagg aggctactga  169900747
gtacacgtgc ttgaacttcc aaggcatgtt ctcaagtaga agtgtcctcc  169900797
tcacaactgc tctgaggcac atgccatcgg aaagctgggc taataattaa  169900847
acaggggtga ttttgtcagc cccacatggc ctgacaaagc agaaacacaa  169900897
tggatggtaa atattctatt acgactgtta ttcccaaccc cctttccaat  169900947
ggggtggtga gtaggaagcc tccctatgac cagtttcttc cccacagtct  169900997
tgccagctcc tgttcttctc atcacaccag gcttgtggcc ttgattttgg  169901047
accctgttgg aatgagggtc acaagagggt ctgtctgtcc acacacacag  169901097
ttgttcctcc tccttcttcc ccacctccat tcttacccat tctcagtcct  169901147
tattccagac tcctcccttg caccagctgt gtccttggcc tggggatgca  169901197
taatgagacc cagatgctgc ccccaaaact ctcagtttat ggactgtcca  169901247
tcttgaagag atgaccacag gatgctcaat gctccagcaa agaggaatcc  169901297
tgtggttcac caaaggcaca caggtctttg gcacttagag aaatcatttg  169901347
tcatatgttc ctctaagtgc caaaggcctg tgtgcctgca gtcattcatt  169901397
aattgaacca atattattca atgagtccat ttctggccac tccttctcag  169901447
ctagccttct ttatgagatt ttcctccact gacactccct gaactgctgc  169901497
tagccccagg gctctgggct ggctttctat tcctccttct gggggtgtca  169901547
ttcattctct tggctttaaa gaccatccat atgcaatctg caggtcctat  169901597
gatcatggcc tccagaatct gtctcatttc gtccacatct catcacctcc  169901647
tgttttctca ctagcccaag ccaaactcat ctctagtcta cactattgca  169901697
gacatttcag gattgcctca ttgccagcaa atttgcctcc tacaagtcac  169901747
tattaattca tatgtcgggt tgtcacttcc tggttttact tcaggtttta  169901797
ataagcctga agggaaacac ttgttttcat tccccagcat gaaactggga  169901847
catttcctct ggtccttgga gtgaaatcca cactcccaac cacagacttc  169901897
aaggccgcac ctgctctgac cctgctgacc tcccatcttt caccactggc  169901947
tgtggcttcc ttgcactttt gcaacaccaa gctttttcct gctttcaacc  169901997
cccagacctg cccgtgggtt gcaatttttg ggcatccgga tctcagcaaa  169902047
tgtgcctgct cctcagaaag gccttcctgg ccgttctgcc tgaagaagcc  169902097
cctgtccaca tcaagggtct tgcatctcat caccctgttt tattttcccc  169902147
atagcgctca tcccaaccta aagtatcttg tgaacgtgct gctggtctgt  169902197
tatccattgt cctcgctaga cttcaagccc ccgaagagca gggacctggc  169902247
ctgcctgttc accattgtct ctagcaccta gaactcaggc ctggtacagg  169902297
ataggtgctc aacaagttgt taaggacaaa tgtcaagaag tacctggggg  169902347
aagtgagggg ctgaattggg gggaataggt tctttggtta tggcccaaaa  169902397
attgctagaa gtttaaatgt gtcttctaag cccagctctc tgtgttctca  169902447
aggtcgcaaa tattaagaac tcagggtaaa taaaaatgta tcctttccag  169902497
tgcctgcatg cccacactga aatgagaaaa gatttttaa ataataataa  169902547
taaaggaacg atctttcaac ctgcgtgcgg gtctcagcgg ctccacttgc  169902597
ctgctgtgtg gatctgacca gtgcactttc actgcctggg tctgggttct  169902647
tctgatgtaa agtaaggctc ccagtataag ctgctttcct tctagattcc  169902697
agggaaatca tctcacaaaa ctcaaatgtg agacaaacaa gatttcaggg  169902747
caaggaaaca gactcaggag ctttcctggg ggcatggctc cctcaaagcc  169902797
tacgtcctgt agagacagca gctgctaggc ttcttggata gagtgcctgc  169902847
ccccagtgcc actcctcact ccaccctgca aaagtctcaa aaggtatgtt  169902897
gaggcacagt aagcaggctg ctagagccca gcatacttac agccctgagg  169902947
ttgtcagaca atgagcctcg tgatgagtta ttgcaccaac agctgttgcc  169902997
cagccctgct atgtggatct tggggacaat aatttatcca caattacact  169903047
ggagagcatg gtgcttctca ggtaacaggt ggaaattcac aagcccacca  169903097
tgtgatgaag acctgccctt ccctgaccac aatgctatga gtaatgactg  169903147
agaagattgg gcagcccatc ctcagtaatg caggatgcac tgtggcccat  169903197
gtctgaggca tctgaaatat cagaaactcc agtgggctta ccatggtccc  169903247
actcctgcca taatggttgc cttacagtgg ctttttcttc caaaccaact  169903297
```

FIG. 1.72

tgccttcaac tgcagaaggt gaggtcccca aaacaccagt aggccatagg 169903347
atagtgtgcg gccggtagaa taagaacctc agacacttcc cacttcccct 169903397
ggtagagaag gtcttagtgg ccacaccgaa aggtaggtgg aggctaacag 169903447
atctaaggct gcccagtgtg ccatttctgc actggatatg aaatgtgccc 169903497
tctctgagcc ctctctctgc ctcagcgatc tcatctatag aatgggggta 169903547
tagagataga caatctcata tgtgatctta ggcaagttca gatctcacag 169903597
tttccaaact tcagtttctc cagctatgaa gtatgagctt gataatcttg 169903647
gctgtgtgac tttggacaag gcccttccac tctctgagcc ttggtttccc 169903697
atctataaaa tgggccaatg gtaggggtgg gaaaaggatg acctctgagg 169903747
tcccttccat acagctgcct ctgattcttc attgcaagtg acccagtgtt 169903797
ccatatgacc catagccatc tgtctgtcct ttgtgccagg cctgaagcat 169903847
tcctttggga ctggtcattt ctcaccgtca ccccctggag tctgccccaa 169903897
tcatttctca gtccttctga ctgtgaagtg tctgtctgaa ctcataatca 169903947
gcttttagct ggtcccaaac agtgagtgct accagctcca ttaatcccac 169903997
tgacagggat ttatctttct cagctgaatg aatgatgctc ccagccttgc 169904047
cccagaaatg tgggctgggc tattcaacac ttgtcaccag caagctcttt 169904097
tcctgaggct gcatactcca gccacccagg tgactgagta ctttgtcatc 169904147
ttcttctcag agcagtggca gaaccacaaa gcaaactccc acccatgacc 169904197
cacccaccca ccttctgacc tagtttggat gctccaagcc ataatgataa 169904247
agtaatgttg tgaagaggga aagaggtttg cagtcagaca gcctgaaccc 169904297
aggttctgcc atgtacaggc tgaagcttgg caagcctctg cacctctctg 169904347
aggtccattt gcacctctct gaggtccatt tgcacatcta caaaaatgcg 169904397
ataacaccta cctagcagag ttcttaggag atccagataa caaattgaaa 169904447
acatgccaga taatgcctgg cacatttag aagcttgaga tctactactg 169904497
gttctcttcc agttctccca tcgtagtaat atcatctaca gagcaagatg 169904547
gggaaaatgc tcactgccag atcccattct aaagaggtat ctccatctac 169904597
agatttattg cacccgggct cctagccata cgccccaaaag tcaaactgaa 169904647
caacagtaat aatatttatt cagccatgtc acactgaact gaggacctga 169904697
cttaagcaac aattcagatc tgccaacatt tactaagcac ctactatgtg 169904747
gcaggccgcg tcgtgacccc ctggagagag aaagatggat tggaaagtgt 169904797
agcatcaaaa ttaacagctt ggtttggaag tcagacacac ctcaggtgaa 169904847
gatatggatt gagtcataaa ctccccatgt ggcactgggc aggttcatca 169904897
cttgaactct ctagacctca gcttttaaat ctaaaatgtc ccatagagtt 169904947
gctacaaaga ttacatgaga tatacactta gcaaagtgcc tggctcacag 169904997
taattgtcag aaacagaaag tgtcgagact caaccctgca tggaaaagaa 169905047
aataggacac acatactatc ttagtccatt caggttgcta taatagaata 169905097
ccttagattg ggtaaagtag tctccccttta tccacagggg atatattcca 169905147
agacccccg ttggcacctg aaatcacaga tagtgccaaa ccctatatgt 169905197
actatgtttt tcctatactt atatacctat gataaaggct aatttataaa 169905247
ttaggcatgg taggagatta acaacaataa ctaataataa aatagaacaa 169905297
ttaccacaat atagtataat aaaagttatg tgaatgtggc atctctctcg 169905347
ttcactcgct caaaatatct tactgtattg tacttactta ttttcaaact 169905397
gcaagtggcc atgggtaact gaaactacgg gaagtgaaac tgctgattgg 169905447
ggggactact gtaatttact ataatttata aataacagaa atgtattgca 169905497
aagtccaagg tcagtgcaca agcaaattca atgtctggtg agggccagtt 169905547
cttcatagat ggtgccttct agctatgtcc tcacatagaa gaagggacaa 169905597
agaagctctg ttaggcctct tttgtaaggg tactgatccc attcatgagg 169905647
gccctgcctt cgtgacctaa tcaccccgca gatgctccac ctctcaacac 169905697
cactgcaatg agtattaagt ttcaacatat gaatactggg ggacatgagc 169905747
gttcacgcct atgtaaatac tacacagaaa gatgtttatc aggtaaaaga 169905797
aagtagacac ggacagtcct catttttcta agaataattg gtaccagtac 169905847
aaataccact taaagagaaa cttcttaaaa caaatgttga ctatttactg 169905897

FIG. 1.73

```
tgatagtgaa ggaaaaaggt tggagtaggg ccaaatcttg aaaaaataaa 169905947
attgaaagca caaaaataag tctttttat tgtctagtaa caaaatgtag 169905997
gttttagtgt caaatgagtt aattttttcc attaaaaata ggaattacca 169906047
agtgttgact ttgggggagg catggcacat tttttagaca aaatcctatc 169906097
ttagcacagt ctaacagttt tgattttgtt tgactttcac agcacaataa 169906147
ataaagaggg tcatttgggg caaatatttc caagctttat ccattttccc 169906197
ataggcctct tccaatcgtt agaagataac atttttctcc tttgaagcac 169906247
ctgacaactt tgtcactttt ctcttcttcg gttgctaact agtttaactc 169906297
tgccagtttc tcatttgcct gtagttaaat gtgaatggaa aagttatcca 169906347
acaatacttt tgctattttt atgaaatcct gaatctgttt aaagatttgc 169906397
acttttcctc ttcatcaatt tcctttgaat ttccattaca tcatcagaca 169906447
tttacaacaa ccaacaagcc gaaggaaacc aatagatcta ggttaaatga 169906497
gtaaggctag aaaccagcgt taatgggagg taaaacttaa gcgtgcataa 169906547
aacgtttaag tgaccggctc attcgtaagt atttttgtgt tatgaagatt 169906597
tttacttctc tatcaaacct tgtaacctca gagaattgaa taatgacact 169906647
tagttgtcaa attcaagata accgacaaga gaccgggcgt ggtggctcac 169906697
acctgtaata ccagcacttt gggaggccga ggccagcgaa tcacctgagg 169906747
tcaggagttc tagaccagcc taaccatcat ggcggaaacc caatttctac 169906797
taaaaataat aataataata ataaaataac tgacaagaat ttctaaagta 169906847
gttcagaata gaaagcttac taagttgatt catttaatgg ttacccttga 169906897
tattttaaca tgtactatta catgttaaca tgtacccact aaatgtctag 169906947
atctcattga tacttcattt aactcctgaa caataatagc ttttcagtgt 169906997
ttggactctg gttacctcct tcctgatgca taggctactg ttcatcattt 169907047
tagttctatc ttgttacttt tagtcattta tatttactat acttacagac 169907097
actgttgggt ttatttttag caccttccta tttgtttttc tatttgtact 169907147
atctcttctt tcttccttta tttcttcatt cctgtctttt caaaaattaa 169907197
gtaaatagtt ttattattgt atttttttcc ttatattggc ttcttgtttc 169907247
acattcctga attttgtgca gtggttaccc tagaagtttt aatatatata 169907297
tttagtttat tatagtgtat ttttaagtta agacttttac ttcttcctga 169907347
acaatgcaag aactttacaa cagttaaact cctgtaccca cttctttctt 169907397
tttgtgctgt tgttaaacat tttacttctg catagttata aatctgataa 169907447
gacattattg tcattttaaa cagccaatat tcttttatac taacccaaat 169907497
atctctcctt tgtagtgttt ttcattcctt cttgcaattt tgtgtttctg 169907547
gattgaataa ttttccttca gcctgaagat tcttatttgg tatgtccttt 169907597
agtgtcagtg tgatggcact aaatttttgc tgattttcag catttgtgtg 169907647
tctgaaaatg tctttatttt gtttcatttt tgcaggattt tttgctgtgt 169907697
atataacaca agagtggcag tgttcttttc ctcttacttt agcattttaa 169907747
agatttttct agagtccatc agtgtttgtt gaaaaatcca ccttattggt 169907797
gcttccttga aggtaatgtc tttttctttt gttactgctt ttgagaactt 169907847
ctctttacct ttgttttcgg cattttgact atgatatgtg tagttatgat 169907897
tttctttgtg tttaactttt tggagggctt ggtgggcttc ttgaatcaat 169907947
gagttggttt ctctcatcaa ttttcggaaa ctcttgatca ttgtctttcc 169907997
aaattttgct tctgcccagt ttctcttctt gccttctggg actccaatta 169908047
tgtgtatgtt agacctttga taatgcccca tgtgttactc atactgttgt 169908097
cttttaatgt tcctttctct tttctctctg gttttaattg gaattttacc 169908147
tattgttctg tctttaagtc actgacccta tagtctgcta tgtccagtct 169908197
gctgtaaacc catatagtaa gtttgtacta ttttattgat tccaagtaac 169908247
tattaacaga tactagattt gagaaggcta tatgtttttg ttcattttgc 169908297
ccatcttttt ctctattctc tttaacagaa taaccatagt caaagtcctg 169908347
tctgatgaat acaatagctg ggtcatctat ggatctgttt ttattgttag 169908397
ctttcttttt ctctttgctt tgcttctttt cttttctctt cttgcttttt 169908447
cacatgcctc ataattttga ccataagctg gacattgtat gtaaaagaac 169908497
```

FIG. 1.74

tgtggaggtt tcagctgata cattccacca gagcagcttc cccctttcct 169908547
ctgttggaga gtcagggtga aggctgatga cctcagtcta gtcagaaatt 169908597
taagaggatt gcagtttgag aaagactgaa tcgaccacct ctggcttttc 169908647
ccatttcctt gtgtggtctt catggctttg gctgggagcc tagctagtct 169908697
ctgtctcctc agccctaaaa gcctgaagag attcagtcct gctctttaga 169908747
agttttgagc ttttctggct atcttcaaaa tctggcaaat atcttgaggg 169908797
gaaaaacagg gatttatgtc aggccctttc tctctctcat ggaatgttgt 169908847
ctcctaagtc ccgtgagttt agcagaaatt tcattccaac cttccatcct 169908897
catttcccag ccacctgagc tgcatagagc acttagcagt gtcctatgcg 169908947
ttaaagccaa cagtcacttg gcttcttata tttcaggctt ctcttgtttc 169908997
caatccatca tgccagccct gcacaactgc caaaagtgct gcttggtttc 169909047
tgctttctcc agtagacaac ctctgcttgg gccaatgcca gtcctcaacc 169909097
cacgtccaga atcagcagtt gcccacaggg aagaaaactg tcaggagtta 169909147
tcagcctaca gaggacccac tttgtcctca tttccacagc tttctgatgt 169909197
cttcaaattt tctattttg cggcttttct tttttttct taatagttgt 169909247
tgcagtaggg gagtcagcct gccacaatct actacatctt acctggaagc 169909297
aataccttat cttgttattt ttaagtcaac aaattagaca ttattattat 169909347
taatatatac agcaatattt agagtcactc gcacataaat attaatttag 169909397
agttaatcac atatttgctt tgtattcctt tttgaatctc tgactttcta 169909447
tctgtgctaa ttttccttct gactaagcca catcttttag aatttcctct 169909497
gtgaggacct gttttattta ttcaaacata aaaaatttgt ttgctctcat 169909547
tcttgaaatg taatttcact aagtattcat ttacagttgg tcaattgttt 169909597
cctcttgaca catggaaaat atcattcctc tgcctctggc tttcattgtt 169909647
attgttgaga agacagatgt tagcctaatt gctatttatt tgtagatggt 169909697
ctaacttttc tctctaacta cttttaatat ttctccgtca caggttgtga 169909747
tgttactttc atcttctgga attgttcttc cacatcttat catcgtcttc 169909797
cattatttcc atctttgtct ctctagcttg ttttatttat aactatctaa 169909847
gagtttacta attgtctcct tagttctttg ctccatctat atctgtccat 169909897
tgtgacttaa aatttccttt ttttaacttt tattttaagt ttaggggtac 169909947
atgtgcagga tgtgcaggtt tgttgcatag gtaaatatgt gtcatggggg 169909997
tttgttgaac agattatttc atcatccaca tattaagctt agtatccatt 169910047
agttattttt cctgatcctc tccctcctcc caccctctgg tgggccccag 169910097
tatgcattgt tcccatctat gtgtccttgt gttctcatca tttagctcac 169910147
acttataagt gagaacatgt ggtattcagt tttctgctcc tgtgttagtt 169910197
tgctaaggat aatggcctcc agctccatcc atgttcctgc aaaggacata 169910247
atcccctttt taatggctgc atagcatttc atggtgtata tatacctcat 169910297
tttctttatc ctgtctattg ctgatggaca tttaggttga ttccatatct 169910347
ctgctattgt gaatagtgct acaatgaaca tacgcgtgca gctgtcttta 169910397
taatagaata atttccattc ttttaggtat atacccagta gtgggatttc 169910447
tgggtcgaat agtatttctg tctctaggtt tttgagaaat ctccacgctg 169910497
tcttccacaa tgtttgaact aatttacact cccaccaaca gtataacatc 169910547
gctccttttt ctgcacaacc tcgccagcat ctgttatttt ttgacttttt 169910597
aatagtagcc attctaactg gtgtgagatg gtatctcatt gtggttttga 169910647
tttgcatttc tcacttaaaa ttttgaacta atgtattttt catttctaga 169910697
tgctctatat ggttattttt caaatctgct aagacatttt tatagtgtct 169910747
tattacttgc tgaaatgttc aaacctcttt tatttcatta agcatataaa 169910797
ttttgccatc tcattttctg tgctaataaa aattctaata tcggaagctt 169910847
taataatcag attctgctat ctctttttcc tgcaagcctt atctcacagt 169910897
accttgtttt cttgtgtgtt ttacaattgt tgacagtgaa tattctttag 169910947
aactttatcc ttgataatta ttagaggaat gaattaaaat ttcacttctc 169910997
cggaaagtac tgtgtttgca ccttttaata actcaagaga ggtaacaacc 169911047
caagttcatt ttcaattaaa attttcattt gaggtttttc agaccacaaa 169911097

FIG. 1.75

```
cccatgtgag agctcacata tggttacaaa ttcttgaaga aaatgaggct  169911147
ccttccttcc ccatccacct tcctagtacc aaagtcagga cagacaggtt  169911197
ttctgtgtta gttcacttct cattcacctt tgtattaaag gtctagctct  169911247
ttgaggttca agttttatgt tgggacctct tcccacttgg tagggcctgg  169911297
gttttaccta ctgggtttct aagcatattt tgtggttaac atcagaggcc  169911347
aggagactca tcagtgtata attaattctt gtataactaa ttatttaaag  169911397
gcagtggacc tattcactag caccctgctt tcggagtcac tgaattcatg  169911447
tttgccctca gctaaagcca tcctgaacct ctttagatgg gagaaccctg  169911497
atgctggtac ctgtagcatg gggctgggg ctggagaagc caagtagtac  169911547
actagggacc tcacggtcac tgtgagggat gggggtctct gcttggcttc  169911597
tgaacaccca aaagtaagct cttctgcctt cactccatgt ccactggagc  169911647
ctgggatcct ctcataagaa gctatattta ctctaatgaa aaaaaatctc  169911697
acctgggctg aaaaagcgta tgctatacat gagccttggt taacctaaac  169911747
tttcatccag agtttcaagg attaaattcc taagttcttt ttaaagcaaa  169911797
gagaagttag ttccagtcct aggccatgat aatgctcttg gctgagaaaa  169911847
cctccttcgt tttttaaaa tatggattct gagggtgcaa gtgcagtttc  169911897
gttatatgga agtattgcac agtgatgaag ccatggcttt tagtgtaccc  169911947
atcatccata tagtgtacat tgtacccaac aggtaattca ccatccctca  169911997
accccctcc tctgttttaa ggaactggca tttatgcaac taattgataa  169912047
aattatcatc tgtctcttaa ccagattaat agtataatta aggaaatctg  169912097
ggatgatgat agcaggttta ctgttgatga aaccattgaa cacttgattt  169912147
aacccattaa cagtgtttct gaaagtatgt tccttgaaac actagaccat  169912197
gaaaagtcct ttatgttgaa atatgcttaa gaaatattat atgcttgaaa  169912247
cttctcttgg aaactcacga agtatattag acattaaagg ctctaagaaa  169912297
tcctgcaata aagaagccta tttaatttta tttgactcgg tgttttcaaa  169912347
ttatgtgtga ccacagaaat agaaggaact tggaggagta ataattcatt  169912397
ttttgggtag aattcactac tgtcacagat atttgtatgc tgtcaatgaa  169912447
catttaaatg tggattatag agaaagtaag atttattcaa caaatatttg  169912497
ctgaaagtcc actatgtgct taccactttg agtatacatc ggtgaataaa  169912547
aaagatatag ttctgtctca tggagcttgt aggagcattg gactgtcgtg  169912597
gaggcattaa gaaagaagta gcaagtgcct agaatccagc tgcccctcaa  169912647
attgttggat cacagccgtg gaacaggccc cagagctggg aagttgactg  169912697
ggcagttggc tgttgtatcc agcctgggag atgcaaaatt tattgacata  169912747
actgtacccc tcaagaggac cataaagaag accaagcaga aacacacttg  169912797
gttctggaac agaaaaaagt ttatctagga aaggaagttt aggaaagact  169912847
gttagataag aaactgggtg gtttttaagg cttgcagaat ctcttattga  169912897
tctgagaatt cctcccaaaa caatccctct aaaagtgcct gattcataat  169912947
ccagtgaatg ttaacaggaa tgacgatgat gattatgatg gtgatgatga  169912997
tggcaatgat gatgatggtg atgatgatgg tgatgacaat gatggtgatg  169913047
atgatggtga tgatgatggc aatgatgatg atggtgataa tgatgatggt  169913097
gatgacaatg atggtgatga tgatggtgat gatgatggca atgatgatga  169913147
tgatggtgat gacaatgatg gtgatgatga tggtgatgac aatgatggta  169913197
acagtgatga tgacaatgac aatactggtg atgatgatgg tgatgacaat  169913247
gatggtaaca gtgatgatga taatgacagt actgatgatg atgatgatgg  169913297
tgatgatgat gacaataatg gtgatgacaa ggttgatgat aatggtggtg  169913347
atggtgatat tggtgatggc aatgatgata gagtttaatc tgcaactcct  169913397
tcccttcact caatgctatg gccaattggc caccaagaac tgtgagtcta  169913447
cttcataagt aactaactct taagctcatc ctttaatttc tttggaacag  169913497
ggcttaacct ttctcaacag ccccctcatc tcatttacct tctttcagtg  169913547
tgtgttcttc caatctgtct ccacactgtg ccaatgtaag cttcctaaag  169913597
tttaagtctg ggtacaggcg cactcactca ctccgtgcac ttttacactt  169913647
ttatgccttt tttgtgttct tctctacttg tgttttctcc ttcttgtctt  169913697
```

FIG. 1.76

ttagcaagac atgtactcat ccttcagggt ccagctcaat ggtgagagcc 169913747
tctctggggc tttggctgat ctcaccctgg aatgcactgc aatgttcctt 169913797
tgcctaggtt cctgcaatgc tttctccatt tatctgtata accctcacca 169913847
cttctaagat tacgttatta tctgagtctg tggtgaggga acataccaca 169913897
tctgacctac ggttcattgc cagccccctc ccagagtgga acactgaagg 169913947
cacatgggca actgttgcaa acgtgcaggg taaatgcacc cccatggagt 169913997
gacagctatg cagaccagag ccccсttctc ccaggttctg tgttgcccac 169914047
acctttcttg acagtcctgg gccagggctt ccccaggttt ggaatccaga 169914097
tgagtctgaa agcaaatgtc attctctttc cttcaccaca cagtagcatt 169914147
tgttcttgcc aaggtagctg tgtgtgtgtg tgtgtgcatg tgtgtgtgtg 169914197
cttgagtgac tgtgagtggt tgtgagagtg tggatgagag tgtgtatgtg 169914247
tggcgtgtga ctgtgtatat gagtgcatgt gtttgagtgt gtatatgcgt 169914297
gtgtgtgtat gtgtaggtgt atgaatgtga gtgtgtgtat gttcaagtat 169914347
gtgtgtgaat gtgagtatgt gatgtttgag tgtacgtgtt agtgcatgtg 169914397
tgagactgtg tgtttgagtg tgtgtgtgta tatgaatgtg tacgagtgtg 169914447
tgagtgtgtg tatgtatgag tacacgtatg aatgtgagtg tgcatgtgtg 169914497
tctgagtgtg tgtatgtgtt tgagtgtgtg agcgtgtgtt gtgtgcgtat 169914547
gtgtgtgtga gtgtgagaga gaatgtgtgt gtgtgtgtgt tcatgccgat 169914597
gttcacgatg ggctggaggg aggaccagtc ccctactgcg tagatcgagg 169914647
atgctgcctt tacccagtct tcatgaagtt ataaaaatta cagccatttg 169914697
tcacaggtct ctcaacacag cactgggccc tgggaggacc aggccacatc 169914747
tcttggcgtc tgaaataaat gaactcattt attcacacat tgaggccaca 169914797
catgtttgtt gcaagtctgt ggccaggcac agggctggga gctggggaat 169914847
aaagagctga cccaaacagc agaaccagtt tgcgttttca tggaattcat 169914897
gatccgctgc tctgacagtg ggcatgggtc agacaatgac caagtaaaca 169914947
gatcagtaag atcatttgga gaaacgagaa gggatccaaa ggaaagaaag 169914997
caggaggcca cgaggagggg agtgtggagg agtgaggggc tgctttaaat 169915047
tcagaaatcc ttgaagactg tctaaggagg tggcgtttgt gttcgggctt 169915097
ccataacagg taggggggaag atggaaggct gctccagacc agtcagggag 169915147
aaggggagtg agggtggttg tggttggacc acaggaaatg caggaaatga 169915197
aagggagggt ggtaggaaag gcaagggcta gaccgcacag ggcctttggg 169915247
gccagcgaag gaagtggatt ctatcctgag tgcaactgga ggccactaga 169915297
agggcttacg caggactgac aggctccgat tgatgcttcc caagttcagc 169915347
cgtgctgcag ggcaggaact gtaggaggag atagcgtggc ccagaaaggc 169915397
agtcaggagc tgtccaggcc agctgacgct gacgatgagt ggggcccaga 169915447
gcttagactc cctgagactc agccctcctc tcccgcagga ccccagcagc 169915497
cagccttgga gggctcccaa agaatgacat caccctcagc tcccagctgc 169915547
ttgatatgca gggaattcct cccaaggcta tgcagaggcc tcaggcttca 169915597
gcagcaagct gcggcccgtg cctgggggag agaggagggg aaaatcgtaa 169915647
ccccagcagc acctcctccc gtgacctaga ctctgggcca gacaccacag 169915697
gcattttctg gataatcctc acaactgccc catgagggac acctctgtcg 169915747
aatcataaaa tcctgaacag ggaaggatgc ctggagatca tgtgacctgt 169915797
acccctgtgt cgaaacctgt gtattcctgg ttcttgttta tttattcatc 169915847
atatccttaa ataacaccct tactactttt caatcacttg accaatatta 169915897
attttcatag ccacttcaga aggtcagaac tatcattatt cccatttcat 169915947
ggatgaggaa aactgaggcc cagaaaggca aagtaacttc tccaaggtag 169915997
cactggccat catttacatc taggcagact gacccagaat ccatgttctt 169916047
ctaggctgta catgatacca cctgctctcg gttgttcatg agctggcaca 169916097
gtggaaagag ctctcctcag cgggctggag catctcttgt acgcccagag 169916147
gtgtgggtga gctgttctgt ggcacaattg tcatcctggg gtctgcgacg 169916197
gtaagactca cctcagagga agggctggcc tttcattcct agctgcaatt 169916247
ccttacaagt aagaaggaga gggcctcaaa caggaaacct ggggtgaaga 169916297

FIG. 1.77

ggtgaacctc agatgcctat cttgtttaac cttctgtctc caggcttagc 169916347
acagtgcctg gtacagagga agtcctcagt aacattgttg agtgaacgga 169916397
tggatagatg tgtgtggacc cgggttcatc cttcacatga gaaagtccgt 169916447
gagatgttta catccaactc aatatctagc acatacaggt ggacaaggca 169916497
gaaaggcaat gtcatggctc ttgccctcac actctagggc ctagactggt 169916547
gtgacaatgt ccatgcttac atgtcctgtc taaggaaagc agctcccgtt 169916597
ggtcatgcct gtggaaatgt ggccctgtat ggccagctct tctgattttt 169916647
cataagaacc tggatggaca gatgccatgc aaagtttttt tttttaattt 169916697
tttaaaaatc gtgtgtatcc caaagaaaat attatctaag ggtgaaatcc 169916747
agcccagggg gcactagttt gagatgccag gtctgggatc agtagcaggt 169916797
ggcccagaat ggggactggg ttggtgaaga ctaagaagaa tgagaagctc 169916847
cctggagcct ccgagaggaa ggtacatttt gcatgccagc ttatccggat 169916897
tcgagacttg ctcgatgttt attttctggt tgtcactcca ggattttagt 169916947
taagtcttgt ctaacattgc agccaggctc agccattctg taggaggatt 169916997
aaaggatggg actgtgtata aaattgggcc aggatggcaa gcgagggagc 169917047
agctcttgag gccagaagag tgggggaaga tggcttgatg acagacggaa 169917097
tctcaggcac ctgaagagtc ttagaagcca gatttggggc tgagccgccc 169917147
ttccccaagt ggagattcac cagccatggc cagactcgag gatgtgagat 169917197
ttatttttct taagatagca aatgtctttg caggcatgct tcccagttgg 169917247
gaaattcttt ttatgctcca tgtaatccgt ctgccagagc ctcctttgac 169917297
tctgtttatc ggttctcttc ctgtatgtgt catgctctcc ttccctctct 169917347
cctcttctcc ccttctcgtc accacccctt tgctctgcac cacccagagc 169917397
ctgttaggaa gaaagggggg atacactcat cctggctcca tttagggtgg 169917447
gcttttaatc cagacatgtc gctgacacca gcatttgcac caggtattta 169917497
attagaccag gaagtcccag gggatttgag aagctggctg gcgaggaatg 169917547
ggctctatct ccatatctta ttttgacaag cactgtaatt atccctcatt 169917597
gctggcaggc ggagcagaat cacgttcgtt cccagcccca tcttctcaga 169917647
acaagagtac tcaggctcct ggttgctcca ccactaaaca actgcctgtc 169917697
tcagttcccc agcgagaccg agactgagct cagccattac tcaggagatc 169917747
gcaggcgggc gctcagccta ctttttgaca gcatcgtgga ggtgatttca 169917797
gagcgcttgc tgcatgcaca tgggaaatag cttccaagga ggatctttgg 169917847
gggcagaagg aatgaggtgg gcaccatgcc ctccaaaaag acagaagtta 169917897
cccctccagg agccagcatg aatggagcac ctaccatgtg cccatttggt 169917947
attgaattta atcttctcaa tagcactgcc aggtcagtgt tatcattcca 169917997
tattaccaat agggaaactg aggctgtaag tgaggaagct gcagagtcag 169918047
ttgcagtggc ctcagaattc cgaccaagag ctagctggcc ccacggtttc 169918097
ttcccttcct actttacagc attgtggctc agggagagca cacatgccct 169918147
catgctctgc cccaaacaat ttgtgggtgc tggaaagttc tggccatgtc 169918197
aggagcaagt gctttctccc ttgctgtgct gcccaaaact tctttaagga 169918247
ggttaccctc atctgtcaaa cagggatgtc cctgtctgtc ccacagagtc 169918297
ttcatgaaat gaactgagat ggcatatttt aaagccctgg gaaaaccgag 169918347
gcagcctcgg gaatggtgac gtatctggtt attgagactg tcttataatt 169918397
tggggcgtga aaacctaggg ctacagggac acaaggtaat gagaggaaat 169918447
tgccaaggaa agcgaatgca aaggaaacac cacccaagcc cagcctggct 169918497
tccaggtacc ctctgaacca gcctcctgcc ccactgtggg ccagaataga 169918547
ccagcctgct aggaaaacct ttggcccact gcaacaatga caatcacaac 169918597
aactcaaccg tttagtgaac acaaaatatg tacgaggcac gggattatgc 169918647
acaggaacca cgtccgtaca tttcattctc aagatcctat gaagtaggtg 169918697
ttattatccc tatttgatgg atgagcaagc tgtggttcat taaaccacat 169918747
cccccatgtc aaacagcaaa caaggggtga ggccagttgg tcttgacagt 169918797
ttgtcaaaat cgctgtgcta gaaaaccacc ctccttactg gttgtgttcc 169918847
aggggttccc aaactcaagt tcttcttgga ggagctgcaa gaaatgattt 169918897

FIG. 1.78

gagggtgata gcaaggaaga atgcatctga gatgccaggc tcaggagatt 169918947
cctggagtcc tgcactgtgt gccctttggc ccagaaggcc cttgtaagca 169918997
cctttaggtg ttgtctgcat ttcccttccc tttctggtca gggaccccag 169919047
ctctctctgc atggattctc ctctccagga ggtggggggt gggagccgat 169919097
gtcaacaggg aagaggggca gaggaacaag gacagggatg gggagaggaa 169919147
gaaagaagga ggtgggatgt ggcagctggg cccggaagca ggctagagcc 169919197
agctgcacag ctctgacaat ctaaagtgtc tcttccgatg gtctccattc 169919247
agccccatct gcagatagct cattttgtga atgaggcctg ggtgtttgtt 169919297
ccagaacctt agctgtgatt aggaaagaca ggagcacttg ggaggcccca 169919347
ccttcaatgc accagagtat ttctagaccc tcattctgca gtcagctcta 169919397
gctgccacat cagggaattc ttgctggtct gtagcctgga ttccaattgt 169919447
ggatgtggcc tgttaaaact ttcctgggta ggacagtgtg ggcgttctgc 169919497
cttaggagtc agacaggcct gagtttatat cccaccattt ccatatgctg 169919547
gctgtgtgac cttgaacagg tcccttagcc tccctcagca gtggagtgga 169919597
agattaagtg cacagactct gaagctaagc cttctcccat gctccagtcc 169919647
cagctctgcc acttactaac tgtgtggcct tggcaaagtg acccaacacc 169919697
cctgggcctc tcttctcagc tgcaatacag ggctaataca ggcatgcatc 169919747
ttatggagtt gtcaaaagga tgaaacaaat tcatgcattt aaaggacttg 169919797
gcacatggtg agtgctcaga catgttagcc agtatccagg catggtggct 169919847
atttctgga ataaatatgg ataaactgag acaactttct ctcctgaaga 169919897
tgggtccatt gcgaagtcat ctcaaagagg tgtggcctgg agaagtggtt 169919947
ccagtacctc atgccttctt ccccttccct ccttctctcc tgcctccccc 169919997
tgcattcttc atgtgcctcc tgctgtaagc atttgctgag cctcctgctg 169920047
tgtcccaagc tctgtgcttg gggtcaacca cccagaaatg aatcgtgtgg 169920097
gtcccatcct ctccaagaca aacagttaga ggatggtcag atagtgccag 169920147
tggagagcag ggaaggcctc gtggacaaca tcctatttga gccacatgac 169920197
catcagggaa gagcatttct aggcagagga agcagtttgt acaaaggccc 169920247
tgaggagaga acaagcttga gaaataggaa gagtgcccga gtgtctggag 169920297
tggagggaca gggagaagat gggtaggaat gaggttgaga agtagctaga 169920347
ggtcaaatca tagagagctt tgaagccaca gtgagaaatg tgggcttact 169920397
ttgagttttc tagcataagg ttgttctgaa gattaaatga caggagacag 169920447
gtagagtgct tggaacagca tctggcgcat tgctgggcct taaataattg 169920497
ttacttttat tatggtggca cttatttcca tattcagccc tgaggctggc 169920547
tgtggtctac taggaaatta ttggcattct ggtttaggag agaggacttg 169920597
acgggatttg ggtgacaagt ctcagttctg cccttccctg gcctagccaa 169920647
gctcccttcc ttccctgagt ttctataaaa tggcagcatc acattcccct 169920697
ccccaggtaa tgtgacaatg aactttaatg taaagtgcca cccacgatca 169920747
aggaatctca tcatttaaac tgcttttgcc atctaaggtc agaaggctta 169920797
aactgagccc gtaattacat caagtgcctg taatcctagc tacatagaag 169920847
gccgaggtga gtggatggct tgagcccaaa agttcaagac cagcctgagc 169920897
aacatagtga gacccagtct ccaaaagtaa ataatttaag agaataaaaa 169920947
attaattttt taaagaaggt ttaaactggt tgtgacctaa ggaaacaatt 169920997
tcttccagcc gcatcattga acaggtggga caccaagctc ccttgtagat 169921047
aaagatcgag gtggaatggg agtggacact gactccatct aagatcatgg 169921097
aagcgctctc acagtgaccc tactgggctc tctggaagct gcatcccagc 169921147
agctgtgcag cccctgggac cagccaggag tgacctgggt gctgccgttc 169921197
aacccacctg tacatttccc aaaaagaggc agccaagtgc tgattcaggg 169921247
aatttaaact ttaatggtcc cccggtctat tattatgttt taatgaactg 169921297
gaaaagcaca aacagaaatc cttaagagca tcagccgtga cacagaaatc 169921347
taatacaata aaacaaagtg cttataaacc ccagagttgt ttaaaaccca 169921397
gaaattgcca attgacatat gggactatat cttcttagcc cctagtaaac 169921447
tgagtggctt caaacaagtc cctatcacct cccagggcct cagtttcttc 169921497

FIG. 1.79

acctgtgaaa taagaggatc aaaaaaagat aatgttctct ctgttctctt 169921547
ccaaccgagg caggcatctc aagtatttct tagtcagttc tactctaggc 169921597
tacacagtat ctgtatctgg cagctgtatg aactactgtt gaaaatcctc 169921647
ttcccaatcc cagtttcaac atcactcctc aaggcagcat ccaccttcac 169921697
tctagactga attaattcct ctgtcttacc acctaaactc ctctagaaaa 169921747
cttgatagag gtaaagataa atgcattttt tcaaaaattc tactttttcta 169921797
gtcccaaggc attgtgtata tcattcttat gtaagttatc acaataaacc 169921847
cataattagt tacttccatt tatgtcaaat cgcctacaaa gcagaaacat 169921897
gtattattca tttttggctt cctccccagt atctagcata cgaactgttt 169921947
gcaaacatgc ccagttcttc aaactttgta acttcatgcc ttttctatct 169921997
actacttggg atgggcccac cctccctttg tcctctaagc acactcctat 169922047
tcatccttca aagtccagca caaaaatccc ctcctctgtt aaacttcaac 169922097
tgctccaggc tgagtcttat gtttgggtcc ttcatacgta cccctcttct 169922147
attgtttggg gtattgtgtg ctgtgggatc tgtttactct cagttctccc 169922197
ctctaggctg ggttccttga aaaacaccct ctggacattt cacctctaca 169922247
tcctctgcat tcttggccag gctctgagag ggcattggta aatgttaact 169922297
gcctggcaat ggtgatgctg ttaacctgat gtgtcagggg tctgaataaa 169922347
gctgcctcaa ggtaggcaga tgcccacaac caagcaagaa ctcaaagctg 169922397
caggctcctc agcctgaacc ttagacagcg tcttggtcac catttcaaca 169922447
ccttgaccac atttctcact ctcccaaatt tcctcctgct tattcctcat 169922497
ccacatacat aaggctgtgt ctcccagggg aaattcaact acttggtaat 169922547
tatcctgctt cttaagtttg ggctagggg attcatagat gatgttcagt 169922597
attatgctgt gcaatgtaga tgcttcctaa accttctcag gagctaccac 169922647
tgagtggcac ctggggacct ctcaggaaga gccagttttc tgggcagtgt 169922697
ggggcaggac agagctcatt aaaccagcct accacctgtc ttccagctcc 169922747
tcctctcagc ctctgggctt ccagcagaaa gcacacgaga gcattcttgt 169922797
tggttttctt atgacttgag ccagcgagac gtacatgccc agcacctgtt 169922847
acctgggctg gctcttggct gagagcatac atgcattggg tcaggtttca 169922897
gatctgctgg aggaacacag ccagaatgtc ttgacaggca gccctggcaa 169922947
agccccagaa aatataagat ctgagtctta tgatggactc tgtgaccttg 169922997
agcctctcac ctcgtgacct tgggcatctc atgttctctc cacaggtctc 169923047
ggttctggac tccttcatgg gagctgtcat gcccctgtca cacagcagtg 169923097
ttgtgccccc ggggatcagg gaccaggatg gtcctttctt ggtggtgaag 169923147
ggggcatttt gcatattcca gagattcaag tttccagacc tatctagaaa 169923197
gaaacatttg agtttacagg ttggcgcttc tcagcctctg tctctcttcc 169923247
tctctgttca tctccctctg tcccctctat gtatgtttgt gtctctttct 169923297
gtctcctctg cctttctttg tcatgtcttt ctgcttctgt cctatactgt 169923347
ctctcacctc caccctggtt ccccccgccc cagatgctct tctctctgtg 169923397
gggtttttttc ttcccctcca tttccttctc ctctcccact ccttcctccc 169923447
cagattctcc ctcactacag gcttctctct aatctctctc taactgccta 169923497
ttcttctcac aagaaggagt cccctctggg gcccagaggc caggcaaggc 169923547
attgtggaca aggagggcat ccgtgccatc caacgggcag gagcccagcc 169923597
tcctggctgg tgcgtggctg tgctgtgggt ttgtttccac ttaccaaagg 169923647
gcatctgtaa ttaatgtggg cagtgataaa ggagctggag atgtgtttat 169923697
gctccttcga gggctgagat gaaacaccca taacatttaa tgtggcgcac 169923747
tgacatttaa atgtcaatta gaaagtcccc gctctgcttg gctggcccct 169923797
gcatcctcag atgagaccgc cctcctccct gccttgccag ccctgctggg 169923847
accaccagct cacaaaagac agtggccaca cagcaaccgt gactgaagag 169923897
tgtgcagggt ccaaagaggc taaagtggct ttaagagcac tccggagggg 169923947
gaggactctt ggaacagaga aaggaggagg atggtgccag gccaccacca 169923997
aaggcacgtg gaagggggct gggcaaatgg tgaaggagca tgtgggagac 169924047
aagtttagag gtagcgttgg cttcctcctc tcttccctca gtacctacag 169924097

FIG. 1.80

ggcagaatct agagcttgtt tgtgccttgg cccttaggcg ctatgtttct 169924147
gcctctgtgg ttgatcaccc tccattagac caagggcttc ttgagaccag 169924197
gttcccatct cttcatcaca caggacgcct atgcacacac ggtgcctggc 169924247
acacagtagg tacacaaggt agtctattca gttcaataca gtatatattc 169924297
gttgagttcc cactgcgtgg tgggcattat cctaggaact gaggctacaa 169924347
caatgattgg gactgagacc tgcccccaca gagtgtacag atgctcttca 169924397
aattaccatg gggctacctc ctgagaaacc cattgtaaat caaaaataca 169924447
gaaatcaaaa acgcatttag taccccagt taatccatca taaagtcaat 169924497
aaattgtaaa ttgaaccatt ctaagtccag atgctcctta acatacaatg 169924547
aggttatgtc tcaataaacc catcataaag tcaaaaaatc tgaagtcaga 169924597
ccgtcgtaag tcagggatca tctgcgttac atttttaaag acagacagaa 169924647
aaatagatat gtggcaaatg tttagatgga agcaaagaaa agaggcagcc 169924697
ggcccacccct ggatgacaag aaagcttctt ggaggaagtc aaatagagct 169924747
gagacccaaa gaataaatgt gcatttgcaa gacagagagg cagagggaat 169924797
actggacaga gggcccagca caagtgtgga gccaggaggg agcctaggag 169924847
tgcacagggg ttggtggcaa tgggcacagc agcttccttg tgaaatctga 169924897
gctcagagac cacatgactg catggggttc tgcaaccagc acgtgagctc 169924947
tgtgagggca agggcctcat ctgtcttgtc cactgctgtg ttcccagagt 169924997
tggggaaagt gcttgatgtg tagcaggcac tcgacaaaca tttattggat 169925047
gagtaaatga atgctgtctt cactggcctc tcctcccttg tccagttccc 169925097
aaagctcagt gggtccccgc aaatgcattt attttgcaaa agcctttccc 169925147
aaagcctggc atccaatggg tgcctcattt cctcatcccc tgcacgccgt 169925197
ctctcagtcc ctgagctgct gtgcccacga catgctccat tttctcataa 169925247
aagcccttcc aacaaggggc acatttgcat ttcaagtttc ctggaattgg 169925297
agtacagaga aatctgactt ccagagccca gggctctaag ctgcagctgg 169925347
agaactgaaa cacagcaagc aggacacctg cccagaataa ggttcaggcc 169925397
ctggaatatc acatgggacc catgctcctg tagctgtctg cagtctcgag 169925447
ccccaaggca gtagaacagg tgttcatctt ctcctgcact ctggaaatgg 169925497
agtccagggc ctgagctact gagtttgtag actgcaactt tggtagcaag 169925547
aggcatttct cctcctcacc tccacccaca cacagatcta gttcccctcg 169925597
tacgctgccc tttcagtctt ggacactgca gaagacctgc taggagagcc 169925647
taagaaaccc aaagccttcc cacctgccat ccaccaacta tcatttactc 169925697
acccccactc ctccagagtg cagatgacta tttcacttac tgatttggca 169925747
ggcgctgctg ctcctcacct tggttggagt agagtttacc ctgcccagcc 169925797
ctgcaggccc agtggtaaag ggaaggaggc tagtgattat tccgactttg 169925847
gatcaatcag ttgctcagtt tattggaatt acatcccagt ggctgctatt 169925897
gatggaactg ctggactcgg gcccacaatc ctcatgccag ttttataaca 169925947
ctgacatcac ctgctcacac acagggcttc ctctcccatc ctgtccccat 169925997
acctcactct gtagcctgag atttctaagg tgggggatct gcactgggtg 169926047
tttggcataa atgatgtaag agatttcctt tgtattgctc tcagctacat 169926097
cttacctttg tgtaagaatg caaagtcata agcacagttt acaattgcaa 169926147
tgggaggtat gtgctagttt taaggtgttt tgttttttt tttgtttgtt 169926197
tgtttgtttg agacagtttc actcttgttg cccaggctgg agtgcaatgg 169926247
cacaatcttg gctcactaca acctctgcct cccaggttca aacgattctc 169926297
ctgcctcagc ctcccaagta gcttggatta caggcatgtg cccccacacc 169926347
tggctaattt tgtattttta gtagagacag ggtttctcca tgttggtcag 169926397
gctggtttcc aactcctgac cttgtgatca gcccgcctga gcctcccaaa 169926447
gtgctgggat tacaagcgtg agccactgca tcaggcgttt taagtttcta 169926497
ccatttgggg catattcagg aagattccta tcccaacaca ccccttcctt 169926547
ctgcttttat aaacacacag agtccccaac caccctacgt cctctttcct 169926597
ccataaccac gtcacagtgc actgtaaaca cattacgaac cagctatgca 169926647
ataacaatct gctgaatctc agagatgcag aaagaaatca ctgggccttc 169926697

FIG. 1.81

tattgataca ttcttatgtt atcattttta atttctataa ttatgttttt 169926747
aaggtacatt gtgtatcagc acagcagcag atgctaataa tatattaaaa 169926797
actgtactcg tgttctggga gtgttcacaa attatagctt cacactattc 169926847
tcatcttctc ccgcctctgc tcagatgtcc ttgaaacatc tctaaggatc 169926897
ctggaaggca aactgactac aacacttatt tgcacagcac agcatctttc 169926947
ctatgacacg tcttttggtt tttccaatca tcaaaagcaa gaggtagcag 169926997
gagaccgagc tgttaggcac tgaccgtggc attgcctcca gggtgaattg 169927047
cgggggcaca ggaaaaacag ctcagattcc tagcttttcc ccaccttcct 169927097
gatctactga accacacttt ctccagggat gtggcccgtg atctatattt 169927147
taagaaaaca cctcaaataa cttcccagcc aggtgtgtgc accacagtgc 169927197
tgggacgtgg tattgttctt gccatgggag gtgggagatt cttgtccatc 169927247
cttcacccag aagcctgcat gtggtttgtc aatttttttt tattttatga 169927297
aacttttttt ctgtttacac tcttgcagaa caaacagaca aattatatag 169927347
ctgatgtcac atccctttga aaaatctatc aggtttcatc cattcattca 169927397
acaattgttt ttaccagtta cacttttttt ttcatttgcc atatacagaa 169927447
actgaggctc agtgagactg agagatttgt ttctgactta gcttgtaaga 169927497
aagagattca ggaactcaac ctaggttacc tggccccaag tcctgtgccc 169927547
ttttaatttt acttccgtac attttaatga aatggctgcg agaccagagc 169927597
tctgtgtgtg aacaagttgt gcctttcaac cttcctttat ctccccttct 169927647
ctttccccac caccaagagc aggctgatga gaaaattaac attcaggaca 169927697
cgttctgctc ccttctgatt cccacagaga gaacacagcc tctgcctgcc 169927747
aattagtgac gttcagatct ctattagaga tggggacagc tagttccagt 169927797
tatgcaaatg cccttgtctg agagtagcca tgggccagca gcatgccagt 169927847
ctcacctctc cccatggagt caccatggat gtgacttgca cctcccgtgt 169927897
tgctttaacc aataatcaaa tcagtatcta tttatataag cactggccaa 169927947
ggtactgcag gaagctcagg gacagatttt atttcagcct aaaggaactt 169927997
acactgagta gagagtgtgg ccagggaaag ggcagatctt tcaaagacac 169928047
tctgttcttc tctaaacact cacagtttct atttattacc caaaaaaata 169928097
cataaggaaa aatacctaac atttgttaag tacctactat gtgccaggca 169928147
ctgttagaca ctttatacac attatctcat tcaagtccat taattttata 169928197
taagaagcaa tatgctattt ggttcaaggc atgtgtttta agtaggaaaa 169928247
actaggattt ttaaaactag gattttaatc ctgccacttt ctccatgtgg 169928297
gacttcttga cctcagttat tcatctgcga aatggaagga aacaatgtct 169928347
gtttgccagg aatattttca gaagcaatta gataaggtat ttaaatccaa 169928397
gcacctcatc ttcatatgac acagcatagt gttaagatgc ctaatatgta 169928447
gggaaatgac aaaaatggac aaatgcagga tattattagc aacaatgcaa 169928497
aaatatctgt atatggatga agagtggaag aggacaatta tgggggaaac 169928547
ttgttgtctt ttaatttctg aactatctgt attattatta ttattttaga 169928597
tggagtctca ctctgtctcc taggctggag tgcaatggtt caatctcagc 169928647
tcactgcaac ctctgcctcc cgggttcaag cgattctccc gcctcagcct 169928697
cccgggttca agcgattctc ccgcctcagc ctcccgagta gctgggatta 169928747
caggcacctg ccatcatgca tgactaattt ttggtttttt gtctgtttgg 169928797
ttgtttgttt gtgtgtttgt tttgtagaga cagggtttca ttgtgttggc 169928847
taggctggtc ttgagctcct gatctcaggt gatccacccg cctcagcctc 169928897
ccaaagtgct gggattacag gcgttagcca ccgcgcccgg ccaactatcc 169928947
gtattattat gtattttcat ttaagctttt aaaggaaaat ggaaacactg 169928997
cattaaactg agcctcagag aaattcagtg acttgtccaa ggtcatacaa 169929047
ggactggagg gaccaaggca ggatctatcc attttcaatg cccatgcttt 169929097
cccccacaca ccatgccacc acatgtccct caggaaacag gtctgcaatg 169929147
attcaggaga cctcgtagtc tacattgata gatgtaaaca gcattggttt 169929197
ctgtcttaga gagtgggcca gtgaggaagg catggatcaa agcaaaaaga 169929247
aaagccaagg agggggagga tggagattaa acaggtccct ggttgtcagg 169929297

FIG. 1.82

ggcaaaactg ttaatgacgg tggagcacca tgaaattaat gacccaccca 169929347
aagcacctga gaaattgaac tggttattaa aatgcaaatc ataaaccagg 169929397
aaaaggagga aaacaagcac gaggaattag gaagaaggaa gatatggcat 169929447
ggagtaccac gaacagaaag tctgtggcca gcacctggat attcagagaa 169929497
agagtgtgat ttaggcttca gaagggcagg ggtctgtagc ttagggactg 169929547
ggcagagctg ttacctagaa aagctagaaa cagaaatgca taaatcccag 169929597
ttgtccctga cagtgggata cagtcagggc ctgaagtgca ggggaaggcc 169929647
atcttaggtc agaggcagtg gttcttggca tacagtggtt ttccccctaa 169929697
gaatgttagg caatatttgg tgacatgttt aatgagcaca accaggttaa 169929747
gtatctactc actgctaatc tctggtgagc agggagacca ggggtgctgc 169929797
taagcatcct acaaggcctg gggacctccc caccaactac agttatccag 169929847
tccaaaatgc catagtgtcg ctggggagaa accctgatct aaggatgagt 169929897
gagaaggtgg atacaggagg tgaggaggtc agaagtcaga ccaaacatca 169929947
gatgggaagc taggaggaaa agaggtcaga aaaggagtta tgaaccaaag 169929997
gacaaaagga agttaagtag tcagtcagga gatgaggatc atagaggaga 169930047
tcaggcaaag agaagtccag aggtggaaaa aagcttcaga gctcagacgg 169930097
gctgggctct aacaatcatc acagaagcag caaagatcaa gaagcaatgg 169930147
ggaaggacag ttgaggctag cgccaggggg aagggccatt ggtgaggagc 169930197
ctttctgatc agaagttgga tggagaacac catggtggat gtggatggag 169930247
gtcaaagtga tgatgttctg gaaagcagtt taaacaaaac aaggggcctg 169930297
cgtgctttac taccagaggc catctgttaa tggatgatgg gaaatgccac 169930347
tcttggcccc cacagtcagg agcaggtcac cttcaactgg gcacagcaac 169930397
acgtcccact gcaggcaggc acaaaagcag aggctcatta aagagctgcc 169930447
ctgggcccag gctacatcct tggcaaagga tgagatttgc acccaaggtc 169930497
aggatggctc gggtgtgtgg agcacgggct acggagccag gtcaatggag 169930547
ttctaaatcc ctgatcagca accttctaca gatgtggcct ttgataggtc 169930597
actgcctctc tctgaagctc agtttcctca cctataaaaa tgggatcgat 169930647
aacagaggtt acatctgtgt ggatcaccta aactgtagag gattttgcaa 169930697
atgtgttgtt gtggttgcca ttcttattgc tggaacataa ttccctcatt 169930747
agtatttctg agtgctctgg tgcatatctg ctgcagcaga atccttcatg 169930797
catccagcaa acatttcctg ggcatgtagt atgtcccaga cactgtgctg 169930847
aacactaaga ttacatggag gaatagagat taatttctgt tctttgttta 169930897
ctaagctcct aggggctgaa aggcatctta aagtccataa acttcctcct 169930947
gatgcttaag taccctccac aacatcccac ttatgtgtcc tgggcttgca 169930997
cacttctggt gctgatgagc tcaccgcctc ctgagacagg tgattccttc 169931047
tacagaccac tcagactatg agaaagttca tgccgggtgc agtggctcac 169931097
acctgtaatc ccagcacttt gggaggccga ggcgggtgga tcacctgagg 169931147
tcagagtttg agactagcct ggcgaacatg gtgaaacccg tttctactaa 169931197
aaaaaaaaaa aaaaaaaaaa aaattagcca agcatggtgg cgggcacctg 169931247
taatcccagc tacttgggag gctgaggcag gagaatcact tggacctgag 169931297
aggtggaggt tgcagtgagc caagatcaca ccactgcact cccgcctggt 169931347
tgacagaatg cgactccatc tcaaaaaaga aaagacaaaa gaaagttaat 169931397
atatacctgt attgagctga aattctggtt ctggcccttt ctctgcggct 169931447
acccaggctt gtgttttcat ctcccacatt acctcctatt agggacttta 169931497
atggatgaca tattgtcacc cagcctcctc tgctggatcg ggatagcttt 169931547
ccatccagac aaagaatttt catgactgag tgaccatccc caggatgggc 169931597
tttggtgtct ctcttccctc agaaagtggg aagctccaag tgctgccccc 169931647
tgaaaccctt ttccagtaac catggcctcc aggggtcctg gggtgatctc 169931697
agaaaggtag acagacctct ttagcagtaa cctggaatat tttgctacct 169931747
tcctgaaatc tagagaacag agcaactttg caagcttctt caaaggagcc 169931797
cgttctgacc caggtcgatg gagctcccaa aatctgcacc cccacccccc 169931847
gctgctgtgt gcaacaggag aggggctttc ccggaccagc ttttccagaa 169931897

FIG. 1.83

acatgaattc ttttgacac ttggcaaaca tttggggacc ctctcagacc 169931947
tcactctggg caggcccgaa ctgtcttttc catgccagag ggcagtccag 169931997
gttcctatca gagttatttg aataatcttc ccaacacctc tgagctgcag 169932047
tttcttcatg tgtcaaatac agataacaat agtacttcac tcataggatt 169932097
ggtggacaaa gtcagtgagg taccaggtgg aaaaagaggt agaacaagct 169932147
gggctttgcg gcatgccacc gtagtcctag ctactcggga ggctgaggta 169932197
ggaggattgc ttgagcctgg aagttcaagg ctgcagggag ctatgatcac 169932247
accaatgccc tccagcctgg gagacagaac gaagccctgt ctctaatttt 169932297
tttttttaa agaggttgaa aggtgtctgg cacttagtaa gccttcaccc 169932347
tagttagctt tgctaggatt atgatttcca tccagacaaa gaagttgccc 169932397
tcagtgacgt tctagcagag tcatcaaaat tgggttaaaa ggaagcaatt 169932447
tagcatggag cgagcctaaa aatgcaccaa agtaatgaaa agagcaaagc 169932497
atctagacat ttgatatctg gctgtttttc cctaggacca ttgtcatgga 169932547
tggggatagg agagccatct aaggtccctg cccatctgca acactctcct 169932597
gtttctgctc cgatgctcta cgatgtcgta cgtggcagag ccagcccagc 169932647
gtggacttca gctctcccag taactggctg agtgatatta gaaaagtcac 169932697
tgagcctcta ttttctataa aattaagaaa aatcacactc ccttataaaa 169932747
tccttaggga aattaaagat ccttgggaaa atagatctct tacaggcata 169932797
tcttggatac ctgatcaatg atagctgcta tagtcttctt ctgatcatgc 169932847
ttttcataat aatcatctta atcattactg gcattcaaag ccatgaagca 169932897
cctgggagaa ggagaagctg atctgtccat gcctgtctcc tttggaaaat 169932947
gcacgctgtt acacttcccc acatgttcaa attcatactc tctcccccac 169932997
cccctttttt gagtgccccc aataggcact tgagaaggct gaagctggga 169933047
ttgtaaactg ccagatctcc tgccttgctc tcaccccttg ttccaaatct 169933097
tatcaaatat taaaagctgt gaaatagagg caggttttaa atcattttaa 169933147
tcacagcatt cctcagcctg ctcaaaaggg ctcaaaggaa tcgattcaga 169933197
agtggtaatt atgactgtgg ccccgtgcca ggcggcgggt cagcattgga 169933247
gcaccagcga cagacggccg gcactgactg gggagggctc ctcccaggtg 169933297
gggacaccga acaggagatg cctcctggga ggaaataaag ctaagtcatc 169933347
ccaggctggg tatcaggttt taaaattcat aaccaagtca actgaaaatc 169933397
agcttacctt tattaagtcc cccactaagt gccagatgct tttagcctca 169933447
tttaaccctc agataactcc tggaggtatg tgtcattatc ctgatttata 169933497
agtgaggaaa ctgaggctaa aaaatgataa gtagtgtccc aaagccaatc 169933547
aaaaagtagc tcaactagat ctatccagct tggaagcctg caatttgttc 169933597
tctgtgtttt ggtcacgctc agattctgag gactgctgca aaaatgttga 169933647
aggaggtgct acccacaggt cccctgctgt ccttctccag cctccaccat 169933697
ctgcccggtc ctcactcact ttcctccctc ttcccccaca ttgtcttttg 169933747
gactctggtt gactcttgct gtcctctggc tactgggatt catccatgca 169933797
cattagaacc cagttaggtc actaaccctt tgaccatcac agcccagctg 169933847
tcatatccct ccctagactc atctcttccc tggccctttc acctccatgc 169933897
tgtatactcc agcaagactt agcttcctcc agttcctcca gcacctttct 169933947
ctcctgcctt cttgcctgtg cgcaggcttt tccccaactg gagcaacttg 169933997
ctctgtctcc acctccaggt ctcagttgaa acatcacttc ttcctggaaa 169934047
gactgctgac tcctaggtat ttttccccta atttatacca ccgtggccag 169934097
ggcttttctg ctatgacggc acccagcact tggttggggt tacttgtttg 169934147
aattgttggg attcctttta ctggccagac tggaggagga cagagagcac 169934197
gtccatctga ctcaccacag tccagggcta agcagggttg ccggtacatg 169934247
gcaggcactc agtagacaat ggctgagtga gttatgtcaa taatgggacc 169934297
gtgcttaaat gtggacattt ctgggggctc agggaatagg tcattctgtg 169934347
ggccagacaa agcatgcaag tgagcagagc tggcccttcg cctacaaaat 169934397
accgaagaat attcttcaat atcacaagaa agtatctttt ccatcatttt 169934447
tcttgaaaaa tgcatccctc ctgatctatc tttcatttcc tcacatttaa 169934497

FIG. 1.84

tagagatgtg aatacagaga actatatctc tactataaga caaatagcac 169934547
cctacgcaca gtaatgacag cccaagtagt ctacttgtag gaacaatgaa 169934597
aggaagtgat gggggctggg gtgaatggag gtgcaccgag cctgtctaaa 169934647
gaggctgctg cttctcaacc tcagcctggt attgcccaag gaaatgtgaa 169934697
ccagtgcagc cagatttcct gacttcaaga ggagctggaa atcgactgta 169934747
tgcgtaatgt cccaattttt aagagctgcc tcaattgaac acgcacaggc 169934797
acaaacaaaa acaaaataaa caagccaaat gcaacatctg ctgagaggtt 169934847
ttggttcttg gattgcaacc tctgcacaca ttttcccact aaataaagaa 169934897
aagctccttg cagatggacc ccggtgggac ctccaatacc cggaatgcac 169934947
cgaatggctg ggatttgtgt ggccccaaaa ccctcccttc ttgcgctcac 169934997
agtgctttct tgaagcttca gcaaacccca gcgccaaagg aaaaatattt 169935047
ataacctgac taggcagcgc ttaaaagatc aaggcatacg tggtgtgcag 169935097
aaatcactcg cacattgttc ctgtttcctc tctgccatag gatcaaatgc 169935147
ttccagtttc aatgattaat cgcctctcag ttttcaccac aagttgtaca 169935197
atgttattga ctgaaacaga aatattcatt tcaggactct gctgctggaa 169935247
caaacacaag ctctggggcg gggctgatga tgactgatgg cacaggttgc 169935297
tgcacatgtt tctgtgctat cggattcaaa ccacccctga gactgctctc 169935347
tttacagatg ggactcaggg aagctcaaac aactatccaa caacaatcat 169935397
ttagtgtgac tttattaatg gccactatcc atggaatgtt tactctattc 169935447
cggatacggt gccaggaaca ttacctatac catctcattt aagcctcata 169935497
acacccactg ttatatttgg gaaggagcct tggcagtaac attttatact 169935547
tgaaataact gaggcagaga agcccaaggc tgctaagcag cagagcagag 169935597
gggccagtcc ccagcccaga gctcccacct cggctctggc attgctctcc 169935647
tatgcaagac cctgacacag acacacacag tcttttccaa gctggctggg 169935697
caaggaacaa tttcttttgc agaaactcga gttactacaa ggcttctgtg 169935747
gacagtctag ggtaatattg gtactttaat tatgcacctg gtgtgttatc 169935797
tatccttggg agttgggaaa ggtgatgctc tggcggtctg gggaaatctg 169935847
ccctctgaaa ttcgagcact cttgaatctc ttgcctgggg cccaattgag 169935897
catggttgct ctccaggaat gtcccagggc agtgcctctc taactcaaat 169935947
cctgggagat attctccagc gtctatgaat tctccaggta acctctttac 169935997
aaaatttaaa atttttcatc aaataataat catgtaaaca tcaatttact 169936047
attttaggtt gtctgtttta atcaccttat aaccatctat gttgggggtc 169936097
cacaaactac agcctgtgaa ctaaatcagc ttccaacctg ttattctaag 169936147
gtctactact gaagaatggc ttcatggtct taacccattg agaaaaaaaa 169936197
aatcaaaaga aaaataatat ttcatgacac ttgaaaagta tatgaagttt 169936247
aaatttcagt gtccataaat aaagttgtat tgagacagca gttctcattc 169936297
atctgtagct gcctttgcaa aaaagacagt ggagttgagt cattggaaca 169936347
gagaccttat ggcccataga gccataaata tttactatat gggccaagac 169936397
agaaagttgg acaattcctg acctatgcaa tgtgatgtta gtggcttatg 169936447
tttgtgcttc cagctgagtt gggtactctg tctgttgtgg ttttgttcaa 169936497
gttcttggat tgcaacctct gcataaattt tcctgctaaa tagagaaaaa 169936547
ctccttgcag agggacccaa gtgggacccc cgatacccag aatgcaccaa 169936597
atagctgggt tttttacttt tattgccata gggctaatga gaaaaataaa 169936647
aatagaggag gactcaggca cttagaacat ttgcagctac agaaagcagt 169936697
aagtcctcac attattgtct acaggttctt tgatattgca actttattaa 169936747
gtgaaaagac atataaagaa accaatttga ccagaagcta attgaaagaa 169936797
atgagttaag ttccttgggc atatttctgg gcacaaaaac atcaccaaac 169936847
ttctaaataa agacccaaaa cacttgtaac actaagcatt aaaataaata 169936897
tgagctatac atgcatttaa gaaagattaa gcaaaacaag tcagataatt 169936947
atttacccaa gtttggtgaa ttagcgagtg ccagcagtca tagtggtggt 169936997
ctgttggatc aaggaataaa tgtttgaaag caaaagttgt caggagcacc 169937047
tcctcctacc acacagttca aaaacaatta cagatatggc aggctcgcca 169937097

FIG. 1.85

```
agcacttcca taccacatgg tttattgcct tgcatttgta cgattatctt   169937147
ctgctttaca aatttttatt ttacaattac ttttattcat tgactgattc   169937197
attttccaat ccacttattc cagttcaggg tcacaggtgg ttggagccca   169937247
tcccagcagc tcagggtgcc aggaaggaac ccaccctggc caggacgcca   169937297
tcccatggca gggcacactc acacacacct acatactcac actgggacca   169937347
caccagttca cttcacatgc acagctctgg gacgtgggag gaaactggag   169937397
tccctggaga acacccgtgc agacatgggg gaaacgtgcc gattccacac   169937447
agacagtggc tctgccaggg tttgttgttt gtttgtttgt ttttcatcaa   169937497
tgttatatga agcaacagta ttcgaagacc tgctgtacag ctttccagca   169937547
gttccaggaa aaaagagccc tgggagactt aagccatcac agtacaaggc   169937597
agtagaggca gggtgaaata gaatggaaaa aaaaaatgtg aacccacact   169937647
gcagtcatac tggaagcagc aatcccattt caaccaaaca acctcacatt   169937697
aaactaatgt tgttaatttg aagtttattg gttttgcagt cgtatttgtg   169937747
tttaatttgg aaatttgttt cagttttata gctgaataag agctaaaaag   169937797
cataaggatt ttatacctaa gttttatgtc tgtacatatt aagtaacatt   169937847
atggtaaagt caacacttac tgaaaatgtc ccctttaata gggcatatgt   169937897
tacttaagtt taagcaggaa aaatgggttt aagaaatacc aattgtatta   169937947
tatctttaaa tatgtgtgag ctgttcaaag ttgccacctg gcagaaaatt   169937997
caatctcagt tacataggga agttcctacc cctttctagg aaagggtctt   169938047
gttaaataag aattctaagc ttaagttgga gacaggttct tgggttgggg   169938097
cagtgatcat tttttaatct tgcttgtatg cctacactgc ttttgtgtgt   169938147
gctgatctgt ccatccttta ggctgtgctc tgcagaatgg ctcaaaatca   169938197
cccctcactt agtcctccca cttgcttcct ttgtaccccc tcagcccact   169938247
ttgcttcttc ctctttcctg gacaaaggga gcacagttgt tctcaacggg   169938297
cctttagaag caaaattctg gcttgacttt ccaatgtggg agtgggagag   169938347
gactgctaaa aataattggt ctttcttctt agcaattcac cttattacaa   169938397
ctgttaggtg gaaaactttt ttttcgtttt actgaaaagt ttaacccagg   169938447
cactgaagag ttagattgta tggacctctt ttaatcatct gctgagttct   169938497
ccaatgtatc agttagctat tgctgtgtaa caaatcaccc caaacgcaat   169938547
gctctacaac aataaaaatc atttattctg ctcactgcct gcagtttatt   169938597
caggcattgg atgagacagc ttcttcctgc tccatgtgga gtcagctggg   169938647
tacttgaact gggacatgga tgatctactt tcaagatggc ttattctcag   169938697
ggctgccaaa tggataccgg ctatcagttg aaagctataa gcaggggcac   169938747
tctgcataag catggctcat ctctacaaaa gctcctcccc agtctccttg   169938797
tttgggcctc acagtgtatg gtaacctcag ggcagtcaga atgtgacaac   169938847
taaagacttc aggagtaagt attccaggaa gcaagatata agctatgtgg   169938897
ccttctaaga cctagcctca gaggtcacat agtgtaacct ctatcacacc   169938947
ctattggtag atattgtaac agaagcccac ccagtttcac agatggggac   169938997
atagactcca tttcttaata ggtaactggc cagagttgta aaagagcatg   169939047
tgggatggaa gatattgttg caagcatctt tagcaaatac aactggacat   169939097
acccaatgca agcacaggat tgatcctcca ctctgccccc ataccccatg   169939147
atttattagc cactcggaca agtgacttca actctccaag cctctgtctc   169939197
ctccactaaa gtggggacaa atgagtatta caaatgagac cattaaataa   169939247
gataatacat tttaaaaatt aacctggtac ctgtcacaaa gtacatgcct   169939297
aacaaatgtt tgcttctgtc tcacttcctc aatttcatct cagtcaacct   169939347
ggactgactc aaaatggcat tcttcttggc tgcccccttt gaagtatttc   169939397
tgctgagaaa atagtttctg tgtatttgta aatttacagg ttgaacatag   169939447
atcattattc aagcattgct ggtcgattcg tcttttcaaa ggcgggagct   169939497
gctggctgtg ggaagggacc cagcaggggt ctcttgcaac cctgctctat   169939547
gggtggggga aatctggacc tccctctggt ggggttgatt gaagtgaagg   169939597
gtcaccatat gtctttccca agagggtgac tgacttcctg ctttggtccc   169939647
agtttccctg agatttcct gaaagccctt ccggctagcc cagttgggag   169939697
```

FIG. 1.86

```
tgttagtaca tcagatccca tgctttggtg aaaaatgtaa acacagacct 169939747
gatttttcat tttaaatgaa gccaagcata ttgctcccag cagatgccga 169939797
gtgactcaat ctgtcctctc ggttctgaag ggaactgaag aacaacatgg 169939847
taaaataaag caaacagcac atttattggt tgataaaatg ctgttttagt 169939897
ctaccctggc attatatggt gattgctatg tggcgaacat ctgttattaa 169939947
atccagactt ctgttgcctg gatacattga gtcaaaagct ggagcggatg 169939997
agaaatccat ttatgcgtct gttgcgtgtg aatgtcagag ctcatatgat 169940047
gcctttgtct tcattctaac tgaatctttt aatatggacc gtctcacttg 169940097
ttaattctga ctcaggggca ataatgtttt catttgatta aaaaaggtta 169940147
aagaaacaaa gaaacagtgt tttctcaggt gctctaagta attctgttaa 169940197
tgaattttcg gagacagcgt gtgaatttga aaagagtagg actttttaaa 169940247
gagttcatac tatgaaccca ataattcaga tcctagggcc ttatcctaag 169940297
gacataatag aaatgagcac atttataaga acaaagatgt tcaatgaagt 169940347
gttacttaca acagcaaaaa aacttgaaag tcacctaaat gtttgtaagt 169940397
caagagcttc attgatattg actgcaaagt ccatgttatt ccatgtgacg 169940447
aatttttaa tcaatcacct cttgatggat tttaaatttt ttacaatttt 169940497
ttgctatcct aaaaaaaatg tgtcaatgaa caactttgaa ctaccctgac 169940547
taccacttta ggatagattg ctagacgtgg aattactagg acaaagccta 169940597
tgttataata ttcactcagt caacaaacat gtcttgagtg cccactatgt 169940647
ggtaggcagg ctttgctcta aacctcagag gccccgtggc agatgaaagg 169940697
ctctcacctt cacggagaca acagagtgag aagggggga agaaaactag 169940747
aggaatctag tagacagtag cagatgctga ggagactgag aacagtggaa 169940797
aggctacaca cagggatctc tgagtgccat ggttcagaga tcattgaatg 169940847
aggtgagatt caaagagtct gagaaagtgc ctgatagaag aggatggttg 169940897
gctctggagg gacagaagtg gagggtggga gtgggggaac tggccttgcc 169940947
tgagtgtatc caaagagcaa atctttctca ctgggctgac tgacctcgag 169940997
aacaggccta tggcccttgt gtttcttcac tgccatcaga aagactgtgc 169941047
acatgaggag atggaaggga ctctcaaaag agagagggga tcatcaggga 169941097
tgagatccgt ggagaatcac cgcagagctg gcagcgttta tctaagaatg 169941147
tggcattggg aaaagtggtg caggctacat tccaggcgat aaggaccaag 169941197
caatgaaata acaaataagt catcttaaag ttaaaggaga tggacaatag 169941247
acaaacaaat atgtttcaaa acatgataaa tgctatggaa gaaataaaga 169941297
gggttggaga gagggttcta cttagatagc ctgatcaggg agaatctctc 169941347
tgaaaagagg atgttttggc taacatatga atataacata tgaatattgg 169941397
gaaagagaca gtcatgaaga gagattggga gcgtaagatt ccaggcagaa 169941447
ggaatagcaa gagggagggc cctgaggtgg gaacaatctt gatatgcttg 169941497
agggacagaa agaaagccat gactggagca tagggagtta tctggaaaat 169941547
ggcaggagta agtgtatcag tcagcaattg tcactgtaat gctgtgtaac 169941597
aaaccatcca aacctcaatg gcatagtaga ggtagctgag tcaggactag 169941647
aacccaggca tgattctctt caaatttttc tctttccatc catattcact 169941697
accttcctat gtacaatcca ctttctctta aagtcacagc agcctcagaa 169941747
tgtattacat acataagaac tagtcctaca tctagatgta atggctttca 169941797
aacctttatg agcataggaa acacctgttg agctggttta gaatatagca 169941847
tttagggcct tgcctccaga tagtctgatt tcacagaaac ctgcatttta 169941897
aaaaaatcac cccaaatagt tatgatgaag gtgatctatg tacgacactt 169941947
agagaatcag tgatggaaaa ttcaccaaga acagccacag gcaggccaga 169941997
agaatggccc tgcccctcta cttttaggat taagcagaag ctggccctag 169942047
atctcaccag ttaccagtga tcttgggcat ttttagcatc atgtgcattg 169942097
cttcactgtg ataccatctt gctggcacag ccatggaaag ccatgagtta 169942147
atgcatctcc ccatgtaaca aacctcccct aggactctgg tccacaccta 169942197
tctctgctag attctctggc attgcaagaa attcttcaga ctgccccaag 169942247
agattcgttc caatctaggg gctccttatc cccagctcag agctggattt 169942297
```

FIG. 1.87

ggctcttgct tggaggcggg aagccctgct gggccagggc ttagaggggc 169942347
tcacaagaaa tcaaagcaag cattctccgc ctctctccta cagccctgca 169942397
tgcatcttct ctgatccctt gcctgagtgg ggggtggcat tccaaaagct 169942447
cattactggc ttacatactt tgccttaaat cagctcttaa atgccctggg 169942497
atgaacagcc ctaaatagga aagaaaaaaa aaaaacaagt ttcttgcaag 169942547
ttcacagata tgcttggtgc tttctgtcag gctagggtgt agccttctct 169942597
gttctaaatt tgatttctg agtctttaag gaaaaatggc tactggtccc 169942647
ctggacgctg attgcttcag catctgaatc tgctccatca cttctacctc 169942697
cacccactgg tccacgtcca gtgggtagag gtaaagggga tggagatatc 169942747
atttatcttc aaaggataaa actgctctga gagatctttg ctttcttaga 169942797
aacactgctg gaaagttgtt tctttagact acattaacag aagtaccatc 169942847
tctaggaaga caaggtggta ataactaaca tcaaatgagc agttcctatg 169942897
taccctgtac atgtcttagc caacttcatc cttgtaacaa acctggaagg 169942947
caggcactgt tatcactctt attcccaggt gaaccagttg aggttccaag 169942997
aagtcttttg tgcaaggtca tgcagagttg aggcccccaa gtcggtagac 169943047
ttcaggagcc agaccctcaa ccccctcact gcctcccgcc tcatgctgca 169943097
ctgagcagac catacccgga tggtcatgtt caggttggct atcaatgcag 169943147
accacgctgg gcatattcag gggacggata ctcagaacta tataacataa 169943197
ggaatagagg aaggactgga ggatgtatta acatgaagaa aaggtagact 169943247
catggcagga gatgagcagg gtaaagaggt gcaagacata aaaagccaat 169943297
ttcatataca tgaagattta tcaagagcca gaaggccctc tatgggtcca 169943347
agagttacaa ggcctaatga ggtgaattaa tgccagcata taaggaaaag 169943397
cttttgaata ctcagaagtg tccaaaaagg ggtcaggctg ccttggaaag 169943447
tagtaagctc tccatcagag gcttggcaac ttcttattag ggatggtatg 169943497
agtatctcaa gtacagatac agatgaccca aataaccact gaggcacttc 169943547
tgaccccaag tataagagat tctattgtaa cgcacaggag tccatctcaa 169943597
gcagcacact gagccatctc cttgataaac ctaaaggtag gtattattcc 169943647
tcccagatgc tgtcttctta gcctgggatg caaaagccat aggatcactt 169943697
cacgtccaac cccatcagg tgatctgtca tgaatcacaa gttattggag 169943747
ccagatggaa ctacagagct aaaagataca tgaagacacc gaggcctgca 169943797
gacagggact aactttccaa ggtcacagag ctaacaagtg tcagagtcag 169943847
gctagaccca ggactcacaa gttgagctca caattagttc cacttcctac 169943897
accacctgga tcatgagtgt caagaatgaa ggacctttgg cagtcttctc 169943947
atccagcagt gacaaacagg atgcacttca tgtgccagct tttaattcat 169943997
tggtcatggt ttcctgaagt gctgttgtcc agaaatattc tgaggccata 169944047
tctggatcca gtggacatga gtgaatcatt tatgatgtct gctttggaca 169944097
caggtgggga agtgacaacc tgtgtaccaa gggtttggca gccttgagct 169944147
aatccatctt aatgactttc tgcacatgct gcctggaagt gatattaata 169944197
ttgcaaaaga gattataatg tgtgataacg ttgtagtacc tcacttatta 169944247
aaataattca aggatccatc tttgatggtt aaacccactg tctatgtctg 169944297
tttgtgttcc tacaaaggag aacccaaggc tgagtaattt gtaaagaaga 169944347
ggtttatttg gctcacagtt ctacagactg tcaagaagca tggatccagt 169944397
gtctgcatct ggtgtggacc tcaggctgct tccattcatg gcagaaagtg 169944447
aagaggagct ggatgtgcag agatcacatg gcaagaaagg aagcaaggga 169944497
gagggggaga tgccaggctc ttttaaacaa ccagctcttg ggggaactct 169944547
cttaggacta atagagtgag aactcacttc ttacctggac aatggcacca 169944597
aaccatttat ggagaatcca cccctgtgac ccaaacacct cccatgaggc 169944647
cccaccccca acactgagga tcaaatttca acagatgaga tgaggaggat 169944697
caaatatcca aactatagca cccacctaac gaatgcaaaa gatgtgcagt 169944747
gaccttaagc cccaacaata tagagcagat gacagttgat atgtagatag 169944797
tttgaatgac agtttaaggt agcaggttgg caggtggctc caccatatac 169944847
ttgttgagta gtcctgagca ggtgtttctc tgagatcctt tggctggtct 169944897

FIG. 1.88

gtaaaatgag agataatgac tctctcacaa ggttgccatg agaaatagag 169944947
aaaataccaa gtactcagca tagcctaaca tttagcagtt gctcaataaa 169944997
tgataggaag tattggcttt ataatattgc atctacccc ttctctctat 169945047
gttagaacct ttccaggcat ttaaaaggtg agcagcaaag gccacccata 169945097
aatgtgctgc tagagagcac ataggtcacc aatctcagac tattggtctg 169945147
aggcagattt ttggagtctc ttattcccga agagatccag ggacctgctt 169945197
tgcaggtgac tgagaagacc aaggccagga gggaaggcca aaaagctcca 169945247
agcagatcac ttatctgtat aacacttttc accttccagt ccttcttcat 169945297
ggagtttccc aaagtacaca cccacagtcc tacaaattgg ggaagagcca 169945347
gaggcaataa atgtgtggga gcagtcagct gagaactgga tgttgaagga 169945397
ttgtacattt tcttgaatta catgggagca aactgcctcc tgagcctgct 169945447
gtacccaaat ttatcaaagc acaaagcatt tttaaagacc atttaataaa 169945497
ctgattaaat gtatttgaca acggagctag aaagccagtc aattcatgtc 169945547
ttcatcactc ctgagaagtt gcctacacga taaaaatgga agttctctga 169945597
atctgtgggt gggagggctt tcactctcct aatggaggag ggaaaaccag 169945647
ggcatgctgg gaggccgtcc cagcccatct tcctgacatc gctgcttttc 169945697
ctgtactgtg ctaagtgcag agaaggtcca gcgccctgcc tgtttttcac 169945747
ttgcattctt gtctccagac tttctttctc tccccaccct tctcatgacc 169945797
actagcatct aagtttatcg cttcctctct gttacctctg tatcctccaa 169945847
gtacatgata tacctctaca gctcatctgc caatgctgca aagtttactt 169945897
atttataacc ttcccagtgc cttgtgtata ttagatgcag gagtaagatg 169945947
ttgtgatcga gatcgtggtg gtgatgatga tgatggggag ggagaggaag 169945997
aggaggggga gaagattagg caagaatgta aaagccctca tgggtcttgg 169946047
aaatcacagc atctaagttc tctccttcct ctcccctcct tcccctggtt 169946097
tagagatgct ttagctagcc taagggcaga atagcctgcc tcttcatttg 169946147
ttcttcaaaa tccattgttt ggggcacaaa atgatcttca gagtttaggc 169946197
tcttgaggct caataaactt aaaatctttt ctcagctttc ctgttagatc 169946247
acccaccccc gaggcaatga atgctgctga gctgatggaa aaagggcggt 169946297
gagaaactcc agaaatattt tccggcagtg tttcttcttt atctctgtcc 169946347
cccagtagct cagtgaggta aagataatca tcagttttta atttttatg 169946397
ttattattgt ggctgcataa cagttgtaca tatttatggg gttcatgtga 169946447
tactttgata ccagcatgta atgtgtaatg atcacatcag gtcgttattt 169946497
taacactgag gatatggatg ctcagaatgg acattggcct cactgaggta 169946547
atgcaggggt aaatggaggc actggatggg gctggaaccc ccatctgtct 169946597
gactcaacta cctgaagatg gaatatgggt tgtgctaact aaattaatga 169946647
gtagaggctg cctgaggcgc tgccttgaga acagttctga ggctgcatct 169946697
gaacttggtg agaaaagaag tgctgtgatc tattagtaat gtctgccatg 169946747
ggcactggac ctgggagcag ccacgggagc catgccatga tccccagact 169946797
ccgtgcttct tagaaattct gattgttgtt tgttcaatag ataaatgaat 169946847
gcagaaactg cttccttaat gtaggcttag agaaggggat tggagtagga 169946897
agcaagagag gcagctcctg ggcctgttca tggtgtgtcg ggaggccagg 169946947
ctggacagta agagataaga acggcagggg agattgagac cagaacttgg 169946997
aaaagcttac aatgccaaac taggaagcct gagggtcgtg aaaggtttgg 169947047
gctcagagga ataagtaaga aaagctgcat ttaacaccag gaatctggca 169947097
gggacacgta gagtcaagga gacagaaaga ccagcttgga gagtggttga 169947147
gtctgcacga ggcgtggagg ggtgcccagc ccccggcaga ggcaggtcac 169947197
agtgacaagg acagaaagcc tggagggaca actccgggga cttagtggct 169947247
ggcagagggg actcttttcc ccagtgactc atatgctcct ttttttctag 169947297
ctgaatttca gttttatttt cagctccaat cagtggcaat agaggaatcc 169947347
gtgtgcttta tttctcctgc tccacattcc tccccacagt ctcccagagg 169947397
ctaacattct cccatcctcc aaagagaaga aatccacagc ccagagcaga 169947447
gcaggcctgg tggcttcatg acagtcatca gtgtggcccc atctactagt 169947497

FIG. 1.89

```
gctctccaag tccagcaatg tgttaaccct ttacaggcat tatcccatgt   169947547
aacccctaac agccctagga agtagacact actagtacct ataattcaca   169947597
ggtaagaaaa ctgaggttca gaaaggcaaa gtaactggtt gagggtcaca   169947647
cagctaagaa gtcgcaaagc cagagtcgaa aatattcaaa accaaaaaga   169947697
aaaaaaagaa aaaaaaatct gagttgaaag cttgctctct taacgatata   169947747
gctctggccc aattaagcta taaaatgtca caggtagcag tgtccttaga   169947797
gaacacctaa gctgagaact ccctcatttt tcagaggggg ggatctgagg   169947847
gtcagtgagg agatctgttt tgtccagggt catcagtgag ttaggggatg   169947897
agccgggact tgaaccctac agtggaagaa atgtgagcca cagaacttac   169947947
catgttgctt gttgacttcc tctggcacat tccactgtat tttccccgaa   169947997
gcctctcccc agcctctcag ccccactcct cgtggctcca ctccctatta   169948047
ctcagaggtg ttcagctcca cccactagtc tcccagcatg gcagtttctg   169948097
cccattacag gcctacaata cctgcgagcc tgtcagcccc ctgcctccca   169948147
cctctcaccc cccgccccgg aaatggttct gttgttaccg gaccaatcag   169948197
ggcacccagc agcgtctaga acttggggct gataatggca tcgtgaatag   169948247
aggaaattag agctgaatgc attcacagtg aatattcctc ccagggcaga   169948297
cggggccatt cgctgagtgg cacatgacag atgttcacat ggaacccagt   169948347
cgcagggcca ccttcactcc tttcaccagc acggctgtct cccagccctg   169948397
gccgtgcttt agagcactct gcatccccaa ccctggccct ccaagccctg   169948447
caggagccag tggttctgca tgtctcctct agtacctctc aagcacatgg   169948497
ccttggccct gaagagcgta gtggttgatc gcacagcctt tggggttaga   169948547
tgtatctgct tccaagtccc aaccttctgc ctcactgctg ggcaggccgg   169948597
gcaacatgcc tgaatctcag tgccccccatc tgtaaaatgg ggataattaa   169948647
tacccacccc acagtggtca tgtgaattca atgtgattat gagtgtaaag   169948697
agtttgtccc catgcctggt atacagcagg tgttcaataa acgatggcta   169948747
ttatgatcat cgattgctct ctgtcacctg tgtatcctcc aaatgcatga   169948797
ctggcctctg caattcatct gcctcaaagt ttacttcttt gtaaccttcc   169948847
cagtaccttg catatattag gtgcaggatt aaggtgttgt gattgagatg   169948897
atggtgacga tgatgatgaa gatgctgatg gggatgcaga ggagggggag   169948947
aagattaggc aagaatgtaa aagccctcat gggtcttaga aatcacaaga   169948997
gggcaatttg ttgcagcaga aattgaatta cctttggagt tatacagatg   169949047
tgctgaaatt tactgtcagc aacaggaaac tcacacaccc tgccgggtcc   169949097
atgccacatt gttctgtgtg gctggggaaa gttacctcat ctctctgagt   169949147
ctgggtctca gtccctcatc ttctccaggg ctgttgttag gagtgaatga   169949197
agccatgctc acaaagtgct tagcacagta cttggcctag tgggtgttcg   169949247
attcacagtg gatattgctg ttgctactct tgtcagtata tttctgatct   169949297
ccccaactta cagatcacca ctccccttga gagcagagtt gtacacttca   169949347
ttgtgtgtgc ttctggaggg cagggatgga acatccattc atttagtcaa   169949397
caactgtgga ttgagcagtg tctctatgcc tgccactgtg ctcagctctg   169949447
accacacagc agtgaacaga atagatgagc tctctctgtc ctcatggagc   169949497
tcacagccca gtggggaaga cagatatata ggcaacaagt ttttaattgc   169949547
aagtaaaggt gccagcccca aaaaacacca agtcacagga tacagaacaa   169949597
tgtgggatgg accgggcagg gtgtatgagt ttcctgttgc tgctgtaaca   169949647
aattatcaca aattcagtgg cttaaaacta ataaaaatgg gccgggtgca   169949697
gtggctcatg cctgtaatcc cagcactttg agaggccaag gtaggcagat   169949747
cacctgaggt caggagttca agactagcct ggccaacatg gtgaaaccct   169949797
gtctctacaa aaatagaaaa attagccggg tgtgactgca ggcacctata   169949847
gtcctagcta ctccaagagg ctgaggtggg agaatggctt caaaccatga   169949897
ggtggaggtt gcagtgagcc gagattgtgc cattgcactc cagcctgggc   169949947
aacagagcga gactctgtct caaaaaaaaa aaaaaaaaaa aaaaaagcta   169949997
atataaatgt attatcttgc agttctggag gtcagaagtc caaaatgagt   169950047
cttatgggac tcaaatcaag gtgttgtagt gctgtgttcc ttccgggggc   169950097
```

FIG. 1.90

```
tccaggggaa agtgtttcct tgcctgttac agcttctgga ggccactcac 169950147
attccttgtc tcacggcccc ttcctccatg tcctaagcac atccctccaa 169950197
tctctgcttc tgtcatcaca tggccttcct ctgaccctga gcctctgcct 169950247
ccttctgaga aagacccttg tgattacatc aggttcacct ggataattca 169950297
ggataatctc ttcatctcaa aatccttaag ttgatcacat ctgcaaaatc 169950347
tctcttacca tgtaaggtaa catattcaca gcttctgggg attaggacat 169950397
gcatccctag ggaaccatga ttcaacctag catgggggaa cccactacag 169950447
gcaggtgttg tccttgccat cgccagctca gtgcttggca cagtagaggc 169950497
catggatatt cattcagaga gagcatgcac tgaggcaagc ctgacctcaa 169950547
gatcaagaca ggaaattggc tttcatgggt taaggacctg ttactttgct 169950597
catcaatgta tccttaatca tcagaggtca gatctgctgg agagtgcaat 169950647
ctttcagttt ccaaaagtaa gactggatgc cttagaactt aaagtcaggg 169950697
aggtacccaa gaaagcaatc atagactgag tccccatgca gtgcactttc 169950747
tcggatggac aatttctctg ttctgacagt cactgttgac tccatttctc 169950797
agatgaggga ccgaggcaca gagaggtgca gtcagtcacc tgaggccaca 169950847
cagtcaggaa gtggaaatcc atggaaactc atcatcagct gcctcgcatc 169950897
agggccagtg ctctttatct ccaccccaca cattataaag ccactcagct 169950947
ttacactcaa gggaacttcc tatttcccta ctggattata tgtataattt 169950997
gtagtattgc aagatttgaa cagaagcgag cagcagcttg tagttgtgtg 169951047
tgtcactcac tcctgcctgt ggggatgcca cgtgattgtt taaagggttg 169951097
gaatcaggag aaaggcaggc tcagagcagg accaagagag agcccacccc 169951147
tcgcctcccc aaatccttca gcttcctgaa gtgtggctgc tgggtagcag 169951197
ctcccccagg gaagaaaata taagatattc ccaagggacc ctggaagctt 169951247
tatcccaagg cttcacatgt gtaggctgtt tcctgtgatt cggtctggct 169951297
gtcaatgatc taagattgag agccaaggtc agtgaggggg gaaaagggac 169951347
atgtagtgca ggggttcagc atccaggcct aggacttaga ctgaggctct 169951397
ttaccctcct ctgtttcttg ctgatggcct taggcaagtc gcttcccctc 169951447
tctgaccctc agtttttccc tctgatgaaa tgggtgtaat aattgtgcct 169951497
acctcttcag ggttgctgtg ggataaaatg agctcatact tacttctttt 169951547
tttttttttt tttttgaga cagagtctcg ctctgtagcc caggctggag 169951597
tgcagtggcg cgatctcggc tcactgcaag ctccacctcc tgggttcaca 169951647
ccattctcct gcctcagcct cccaagtagc tgggactaca ggtgctgcca 169951697
ccatacctgg ctaacttttt ttgtattttt agtagagacg gggtttcacc 169951747
atgttagcca gtatggtctc gatctcctga cctcttgatc cacccgcctc 169951797
ggcctcccaa agtgctggga ttacaggcgt gaggcaccgc acccagccag 169951847
cgagctcata ctttcatgtt agcattagca tagttcctga caataagaac 169951897
caaatacgtg gtatctgcta ttttctgttt taattaggta ttcagagtct 169951947
atgttaaatt aattaacata tatacttatg gaacacctac tcagtgccag 169951997
gtattgttgt agatgccagg agtacagcag ggaataaaac aacatccctg 169952047
tcctcgacac aaacacacaa gtaaatagag aaggtcagag ataaatgctg 169952097
tgcaggaaaa caaagcaaag tgagggatgg agagtgcgga aggttggggc 169952147
acttttgttt cagatgagtg tcagggaagc ccccttggag gaggcactgt 169952197
aagggcacag actcgaatga aaggagtatg tgaaggtgct taaattgttt 169952247
ctgtttggtt tggtgtggtg tgatgtggtg tggtgtggtg tggtgtggtg 169952297
tggtgtggtg tggtgtggtg tggtgtggtg tgatgtgatg tggtgtgcgg 169952347
tgcggtgcgg tgcggtgtgg tgtggtatgg gttgaggctg gccttaggag 169952397
cctgttggcc ttccaggcca gtcctgaagc ccagcccaga gcaccagact 169952447
ctgcagtcag tcagtggagg gcccacatct cagccaatgc atggctttgg 169952497
gtggtgactt catctcccct agtgttcctt tccccctctg caaaatggga 169952547
atggggatgg ctcagaactc ccagcgggag ttaggaggaa taatgtatag 169952597
gaagtatgag cagagtgcct ggcctggagc atagcgcatg gccgatcata 169952647
ggtaagtgct ggtgttgatt ttattggaca caagtttgga aactcagagc 169952697
```

FIG. 1.91

ctgcagggat ggccttgaag gtaaagaaga ggtagttggg agttttacac 169952747
ttcccaggac ctaccctcag agagacaggg gtcattccag agtatctgga 169952797
tacccagttt gggccaaaga tacttccagc cagggcactc gtcaaccacc 169952847
ttgatatttg cccaacacag ctcctctgag gagagcttga ggtctggggg 169952897
ccccatgctg ctgattaaac tgatggctgg gaggcaggta aagcaagagt 169952947
ggagaagtga gtctggaggt ggaaatgaga tctccaagga ggggatggct 169952997
gactgaggct gacacgtttc tatccaaccg gtagaggatt tgcagttgga 169953047
ctctgcttta tggcttggtg atggtcagtg ttggggcagg cactaggtca 169953097
gagggtgatg ggaggggtga gggaggttcc agtctcacgc taggctgcct 169953147
gcaccttcag cctcagctac ctcaccacct aactggggag gattaactat 169953197
aactctgacc attcctggga ctgtctccat ttcaaacaat cagatcccct 169953247
gccagactgt attagtcaga gcagtgcaaa tgctgtaaca aacagcccca 169953297
agtgtctgtg gctgaaacca tgacagttta cttctcgttg ccatggcagc 169953347
cagtgcagct cagagtggat gggcatgtct gcatctgcat gcatgcaggc 169953397
tccttccatc ctgaagctcc ccatcctcgc ccttacactg ctggctggga 169953447
aagggagcct ggaggaagcc tcaggtttgt atggggcagg cctggaagtg 169953497
aggtgcacca cctccactcc tatcccctgg gccagaactt gggcatctga 169953547
ccacacagac ttcccttgga aggagaagag aacaaggaca ctgtgcacct 169953597
ttgtcaagcc aaccaccatg cccatggagc atctactatg tgcagagatg 169953647
tcagctcctc cagacaatgt tctctgtcat tttccatctg ttcaagctga 169953697
gtcagaggtg tgtacatgtg caaatgcgaa caatccaggc tcacttcctg 169953747
cttccctgag tcctaggcta acctctagca cagcacagat cacaagagtg 169953797
atgactgcct gaccgtgtgt ccttcctccc agtagagttt gagccacatg 169953847
gaggcagggg ccacagcctg tattctcagg acttggacag cggtggaagc 169953897
tctacttagc ttgctgaaga ggaaagggga aagaaaggag agtgaattgg 169953947
cacttgtcga gatctcccag ttcgtttttt aaaaattgtg gtaaaatata 169953997
tgtaacagaa aatttaccat cttaaccatt ttggagtgcg cagttcagta 169954047
ccaccaagta ccttcacgtt gttggacaaa cttcaccacc atctgtctct 169954097
agaatgttct tcatcttgca aaaccaaaac tctgtaccca ttaaacgact 169954147
ccccattccc tcttccccca gctcctagca actaccattc tattttctat 169954197
ctctacaaat ttgactactc taggtacctc gtataattgg aatcaacagt 169954247
atttgtaccc tggcttattt catttagcat aatgtcctca gactttattc 169954297
atgttgttgc atgtgtcaga atttccttcc tttgtaaagc tgaataattt 169954347
ttcattataa gtatatacca cactttgttt atccattcac ttgtcgatgg 169954397
aaatttgggt tgcatccacc tttttttgct attgtgcata atgctgctat 169954447
acacatggct gtgcaaatat ctaatattag tccctgcttt cagttctttt 169954497
ggatatgtat ccagaagcag aattcttgga tcatatggta atcctatttt 169954547
taattctttt aggaactgcc atattgtttt ccacagcagc tgcagcattt 169954597
tacattccta ccagcagtgc acaagagttc caatttctcc atatcctcac 169954647
caacacttgt tattttctgt tgctgctgtt tgttttttta ttaatagtca 169954697
tcctaatggg tgtgaagttg tttctcattg tggtttgctt tgcaggtttt 169954747
gatttgtaga ttttcctgat gattagtgat gggtgcatct tttcatgttc 169954797
ttactgacct tttatatatc tttcttggag aaatgtctgt taactctact 169954847
catacttttg taaatagtat tcccaatcct tctaactccc caatgaggtg 169954897
gatattagta tgttcgtgtt acagtaaagc caactaaacc ttagaaagac 169954947
taggttaatt atccaaggtc acacagctag aaaatgacac agcttgtatt 169954997
gaaacatcag tttttctctt tccaaaccta acgcacattt catgaaacct 169955047
acattattgc accataacat catgttgatt tacttatctg ctctcctgcc 169955097
tgtcccatct actacataaa ttgagtgtgg tttgaaatca gagactactt 169955147
ctcatctttg gcacagtggc agccatggat cagaatctct tacatgctgg 169955197
ataagtggat gcaagctcaa ggccacacct aaagtcccca ggtgacttga 169955247
tcacttgagt tagctgctgg aaacctgggc ttcctcttct gcaaaatggg 169955297

FIG. 1.92

gagagaaaat aaattctcag tggattgttt agaagatttg agcaaagacc 169955347
tctgcaaagt gctaagcatg tggctagcat gtggcaggtg ctgcctaaat 169955397
agtagaaatt aacactgcca tgcttataag ctccggacaa acacaagaag 169955447
cccgaaacat aatctgtgcc ttctgcttgc attcctccta gttggggatg 169955497
taaaatagcc cagctacaat caaagaagaa aatcaaagtc agcacagact 169955547
atggatatgc ttctatatgt gtagattatt tccagactca ttcggaagaa 169955597
tctggacata ctggttgcct cagaggtcaa gaaaattggc tcatttactt 169955647
ctgtaactta atttcgactc tctatgcttt tacatagttg gaatttgcca 169955697
tgcacatata ctacatttaa aagagcgtgt acgcgagaat aatgtggtca 169955747
ggtggcctga tccacaggtg ggtgggagag acaacagaga cagtcttctg 169955797
accccatctg gcttctacct gccaacccca tgtattctgg agactctcca 169955847
cacctcctgg catgaagcag aatccctctc agggggtcac ctcacctcct 169955897
tccagaaatg tttaacagaa agaacctacc attggctttc tccatcccca 169955947
gcacctaata gagatatcac ggagagggga gcatttgtaa tttactttgg 169955997
aggggtgtgt ggaggccgag taacaccgcc ttccatctca gtgacaacaa 169956047
actcattctt cactataatt aaaatgtcac tttgataaat aattccatca 169956097
gccccсttcc acctatgaat agcttcttgc tataattgtt cacattctgc 169956147
tgaattagaa gtattcaagg gagaatttaa gaggtattta ggcaacaaag 169956197
ataaatcggg tgtgttttcc accctcccac aatccctcat taagcgagac 169956247
atcatccccg gctgggcagg gcggggctgg ggggcctcat ccctgtgttc 169956297
tcagtcactc tctccctgag tggagggagc cggaggggtt gccacagcag 169956347
cgtggacctc aggaaggggc tggagtttgg ggatacatgt ttgggggcct 169956397
tcccttccca gctattactg tagaaaaaga agaggatgcc tgaggtggtg 169956447
ggaagaacgt aggctctagc ttcaggtgag cttggaaaag tcagtgaaca 169956497
tttatggacc tctgttgtat aacagaatac aagatataat tcttcattca 169956547
atcttgtgtc aagagcttga gtcaagatat aattcttgga agagacatct 169956597
gacattgagg gtcccccctc ccatgttatg ggactcaagt cttccaaagg 169956647
atgactttcc ctaggagaca cagctagaga ttggcaaccc caggaccttt 169956697
gaatattcaa caatacccag tagggtatga agcaccgtag gagttccgtg 169956747
actattccca tcttccctca tttttgttgg tacctcttcc ttcctgataa 169956797
atcacatctg ctgggaataa tccaataata ggatgcacag agccagccac 169956847
agtgtgttgg acacctcagg aagtgtccca tcttgggtat gtctgtcctc 169956897
accttgggta gaaagagatg gtatttgact ctttccccac cagaagaggg 169956947
gtatggccat gtggttacaa gagcagcact tcatagtatg aaagccaggg 169956997
ttccaagaca actactccca gtgtggggct ggcatgttag tgactctaac 169957047
tacagtttct ttttttttat tattgtttga gacagagtct cgctctgcca 169957097
cccaggctgg agtgcagtgg cacagtctcg gctcactgca acatccgcct 169957147
cccaggttca agcaattctc ctgcctcagc ctcctgagta gctgggatta 169957197
cagctgccca ccaccacacc caactagttt ttgtattttt agtagagatg 169957247
ggtttcacc atgttggcca ggctgctctt gatctcctga cctcaggtga 169957297
tccaccccac tctgcctccc aaagtgctgg gattacaggc atgagccact 169957347
gcacccagcc taactacagt ttctttatct gtaaattgga aataacaata 169957397
gtcccactga tgagttatgg aaagtagggc cttccacggt gtctgcatgt 169957447
ggcaaacatt acccatagct cctgttgggt ttctcgtgag gagtgtaaca 169957497
gtttggccat gcagttttaa atgccacatg agcggctagg tgggagggag 169957547
taccgggcca atccaactca gtcaacacag gtcccccaca ccatttcctc 169957597
tgtggcaggt ataagagtca aggcccactt caaggccacc aaagtccaag 169957647
catctcccca gtcctagctt ccccagagag tcctgaatga caggtattca 169957697
ttggttgtga tggggcttgt ctggggttgg ggactggggg tgaggagtgg 169957747
ggtggggttt aaaaatggag ggcagcggta ccagtgaagg ggaagcagtg 169957797
ataaaaccca tttgagtttc tgctctgaag cagagtccat taggatgacg 169957847
gctccttgga ccagggagct gcgtctgagg ggctgtgccc agttccatca 169957897

FIG. 1.93

```
gtggtgggat tgggagtggt ccatgaaaat aactcacatg catgtgtggc 169957947
tggctgaaga agcagagaag cctgcatggg cagccaatcc ccatgctgag 169957997
cgctttgctt ggaatggctc tgataaagaa gcccatgatg ctggaaggaa 169958047
gggctccctg caggaccctc tgggatgatt ccctgcccat ctccaggacc 169958097
accctccaga atatggtcta ggatggcctt gagtgcgtag gtttcagaat 169958147
gtgggaagaa ggggcaagga gaaaaaaaca agcacctatt gatcacctgt 169958197
gttagctcat tcaatctttc taacatctct gcaggttaaa tattctatcc 169958247
cattttacag agggcaagct aaaactgaga gatctaagat gattttgcca 169958297
aggttacact gctagcaaat ggttagattt gaacccaaga ctctaactcc 169958347
aaagagccaa gctctttaca gtggatcagt ccatcatctc tttacatttt 169958397
acaagtttgt gtcatggttt tagacaatat gtttgacatg caagacgctc 169958447
tgctaacctt aatgaaggtg tgcatgtgag atgcatgtgg gagtcagtgt 169958497
ctcgggtggt gagcttcatc cagactcatt tcaaactagc ttgcacagca 169958547
gagcttccag caatgcaaat gccaggttac tcgaggctcc ctctaagatg 169958597
cagggactca aaaagttgtt tctgaagctc cagggccttt ataacggggc 169958647
ttcgaaagca gcagaaagaa acagcacaca aagtgtttgt ttattctctt 169958697
gtattcaaga aagagccaat aattcaaaca actaattcta gaagaataga 169958747
attcccccag tccccacctt aatacaggca ggctcacctg tccattggta 169958797
agtcagcaca tttctctgtg aacactgatg ccctgtgccc atcacaccca 169958847
tagtatcaac tgtcaggaca gctgccagat gaaagtgctg tcatcatggg 169958897
cagctgcctc ttggaccagg agctaaggga gaaactcctt ccttagagac 169958947
ccacgccaga ctgcagtgtt gtttgagaga cctgagtctc tcagggatgt 169958997
gttctggaga tctgcgagca ggactgtatc catgaatcag gactctgtct 169959047
taagccacag tagggaagag gaatggcaca atagaggaaa caccacccca 169959097
cgtagcatgg agccatggag agagcatgag tttagaagcc aggagcgcca 169959147
gctctgccag ctactggcca aaccactggg ggccagtgcc tcggccatct 169959197
gtgaacagac actgctggat aatgatctca aagctctcat cctgtctaac 169959247
accatccagt ttgagacctg cttaatcagt ggggttctgg gaggccagag 169959297
ctggagctat gatcagggct aaaatgcata cagaaagcac agatgctaga 169959347
agccaaatgg aggttgtcca gggggtcccc aaccatggga ctggaagcag 169959397
atgtcaaaat caaggatcag agcttctggg aagcagacac agcaagggaa 169959447
catgagtagt gtgagctcac gctgagtgag cactggctgt gcaccagtat 169959497
tgaataggta ttaactccct tcagctgcac aattatgctg taggtgagtt 169959547
ttaccttggg aaaccaaggc acagaattta agtaacatat tgaagctcat 169959597
gcagctgcta acagggaagg ccagggtctg aacccagctg atccggctcc 169959647
agcatccgag ctctgaacca ctggtctatc ctgcctctgt taggacttgg 169959697
tccaatgtca tcatcctaga aggaacattt aggcccgcac ggtgggtggc 169959747
tggttcaatc cagtttaaag gccaggagca ggacagtgac ttgcagctgc 169959797
agcaatccta tgactcaaac caaagcagct gtgacaaata aagggactga 169959847
ctctcattct cccgtgctag ggaaggatga gctatcaggc cttgttgcag 169959897
gctgagtcag tcatcccaca aaccacctaa gtgaaacctc ttcactgagc 169959947
cttatttcct gagcgctctc cctttatctg tgcttgcaaa gaggcgtctc 169959997
cctccatgcc agccaaccca cccacccccg cacacacata ccacctctgg 169960047
ctggaactga cgaccatggg ttttagaaat gagataaatc tgggagatga 169960097
atgtattcat gagcccataa aggggtcatg aatcactggc cccaattact 169960147
gccttcaatc ctgacaggat gaattccctc aagcagattc tccttgtcag 169960197
acaacacggg aggcagtgtc atggctgatc tagagccaca gataacatca 169960247
ttattccata ccaggctggt ttcggtttcc caagccacct ccacttgatt 169960297
tacagctcac ttctgatgct ggagagagag ataaatatat atatatatat 169960347
atatatatat atatatatat atatatatat gaaagaaaga aagaaaagag 169960397
agagagagaa agacacaaag gggaagcttt catgccaagt ggaaacaaga 169960447
caaaataaat gcaccgaatc cgatttcaaa agctgtttga aaactctgtc 169960497
```

FIG. 1.94

```
cggaattgct ggaaagggcc ccagcatcca caggaaatgt atccctgcca 169960547
agccctgtgc tactgaactc tgtggccccc actcctgcct cccggtgact 169960597
tgtttagaac tacttcagat cggaacaaat cacagccaac tgcagtcgct 169960647
gtctctagcc cttcaatcac tcctaatcag accgtgtatt ttagcaacag 169960697
aatcttccct ggctgaggag ctcattcatc tgccttccac cagctcgaca 169960747
ccctttgaat gggagatgag gggaagccac ctgcttctct ggcagccaag 169960797
ggaagctggg aggaggcagg aattgccagc cctccctctc tgatagatca 169960847
ccagtgggag tccagaccag caggaaccag gaaaggaggt ggcaggtcag 169960897
agagaaggca ctgaaaaggg tcatctgagt ccatgtttgg tgaatgccca 169960947
ccttgagctg gacacctggc tgtggtccct ggagttggat agcctgggtt 169960997
caaattcttt aactaccatt ttctggccaa cccattctct gtgtgccccg 169961047
gacaaggtac ctaccctgtg agtatagaag caaaccccca gaaaaagca 169961097
agtggaaaaa gcaaagaacc aggacatggg tggactcgag tcctagagag 169961147
gctcaggaaa cttttatcca aagacacaga ggagctggtt gcagaggaga 169961197
gcttaaactc acacagagag gggaggcctg ggaggtgtca acaagttatc 169961247
ttctcacttc agaagggccc tctcgagaac agggatttcc cctgctctgc 169961297
aagggaccag tggacagaag tcagcagagg ccatgtaggg gcaggagctt 169961347
cctgtcatca tagatgccaa agctgaagca ggatactgaa tgcaaacagg 169961397
ccctgaggcc atctgatgtg ctcgttccca tagccccgct gtgtgtgtgt 169961447
gcgcgtgtgt gtgtgtgtgt gtgtgtgtgt gtgtgtgtgt gtttggtggg 169961497
gtgggagggg aggcagaaga ggaagagagg gcagagagcc aaagactgag 169961547
gccccggccc ataagtaagg cagtttgcag atctcaatat cctgtgcaga 169961597
cccacaggct gccgtggggt tgagggctgc tggtgtctta accagaggca 169961647
gagactggaa ggagcaccag atagaactga ctcactcctc cttcctctac 169961697
cacatttctt ctctgaaaat ttgccattaa tcacaggtga cgatggaatc 169961747
agcaattaac atgagctaaa acaaactact aggcatacag tagcgctcaa 169961797
taagtgctag ctattatgat tacaatggag ggaaaagttg tcaccgcagc 169961847
acaccgtgca tcccttttg gtctggggcc tctcatccag acacaggtaa 169961897
gaagactcct cactccccga ggaatcgcgt gcaatgtcat gatggcatct 169961947
gatttagttt tcccacatct caaatgagat cagggcaact agtcttactc 169961997
aacccttcag acttacatac cctgtgtatc aaggaatgag tctcccatca 169962047
ttggagacaa tcaagtagag cctttctggt ggaggagaag gaagtagaca 169962097
agtggagctc agaggtgccc tcccaccccg agattccatg atgctcagga 169962147
ctgtggaatg agcacgggag tgtgatggac ctaggggtgg ggaagagcga 169962197
gaagttcccg tgcaatggac ctaggggtgg ggaagagcga gaagtcagaa 169962247
cactggcaga agaggaagaa accagacaac ctggaagcca agcagatgag 169962297
tttcacctgc atatcctctc ctcttccccc ttcctccagc gttgacttat 169962347
gggaggtatt tcagtgagga caaaagagga cttagtcaaa caagcactta 169962397
ttgaaagaaa atatattcta cacagcactt ccgtcctttt aaagtgattc 169962447
actccctttc cactgcctat tctgtttagg agaaaagtgg agcttcttag 169962497
cttggtgccc aaggtcctca tcaatcctaa gatgacattt attgagagca 169962547
catgatgtgc caggcattgt tacaggcacc agctcattca agccatataa 169962597
agacaaccct gtggtgtagg ttctctcagg gtcacccctt cagatgaaga 169962647
aactgaagcc cagaaaggtc aattaacttg ctcagggcca cacagctagt 169962697
tagtagtaga gctgggacct gaactcaggt aactggtcct tacgctactg 169962747
ttcttaatcc cgtacttaag tcgaccagcc ctgccctgcc ttggctccag 169962797
cctcacctta agtttctcac cacctggagt ttttggccaa tgccacacgg 169962847
aatgaccagc atttctctga acacatcatg ctgtatttag cgtccaggct 169962897
ttagcacagc tgttccctgt gcctggaatt ctcttccttt tttgtttttt 169962947
tctcacccaa aaccagcttg tcctttaaga tccagcttaa tgttctccta 169962997
ctcttgggag cctttttgg tgcccccaac cccatcaggc cacgtagcac 169963047
ctggtagcac caggtagcac cccatcctct gtgtgcccac gcctacctcc 169963097
```

FIG. 1.95

tctctacctc acccaccctg gacagaccct cacaccacac ttctcacatt 169963147
acattgaaac tgatgactgc cttgtcatct tctccctgga gcatgtcatt 169963197
catggctgtc tcctaagggc ctagcttggt ccctgcattc agtaggcagg 169963247
tactatttgc aggggcagga cagcaaatgg ttagagctta agctctgcat 169963297
ccaaaagggc ctggattcag atctccactc agccatgtgt tagctgtgcg 169963347
accctgggca agctagcccg ctgctcctca cactccacgg tcgctgtgag 169963397
gtgtaatgag atcgcacata taaattgatt agtgcagggt ctggaatgca 169963447
gcaagcagat ggccaatgaa tgtttggcaa cactgcactt cagaatcggg 169963497
ctctacctag acagacttca tatcaaattc cagctctccc acttaccagc 169963547
tgtgtgacct tgaacaagtc acttagcctc tctgagttta attcctcctc 169963597
tataaaatgg gcttcatatt tttaaaatgg caaagattct aaagattaca 169963647
aacacaacac ctgcgtcgct tccctctgtg tacagagcag cgttgttgca 169963697
gtttgcgcgc taaggctgta gactgggctg cagtgccttt taaatacacc 169963747
agctcctggt ttggagctaa tgggacacat gccggggacg gctgggagtc 169963797
acagcggtgt agaggagaat atggcttcaa gaaaatgaca tttggaagta 169963847
attatgggag caatggatcg gaaccacagt cagctgccag ctatccccag 169963897
agacatcaca ggagaaggag gcagaagctg gaacatcatc cgggagctgg 169963947
actagaacgt cccgggaaac ttcagcctgg cttctgcttt gtcccgaaaa 169963997
cccagggctc cagctccagg gctctgtctt agaatgaggc agtttatctg 169964047
ttcagggctt ctcttagttt ttaatcccaa taggacacat gttgtattaa 169964097
aaagccatgc gagacggaag aaggaaattg aatgaaattt gagggcaggt 169964147
aggagcagag acaataaata attcagcagt gaaggaagca gaaaaaagat 169964197
tgcactcatt tcgcccttca acaattatac taaacacctg ctctgggcca 169964247
cagaagggcc agatcccatt cctgtgctca ggaagcccac aggccggcag 169964297
ggagaggctg gttggaatgt gtgctttgca ctgtaacgga ggcatcgagc 169964347
atggtaaggg actggcggtg gctgctgcct gcggacgtcg agcaggggcc 169964397
tttgaagagg caggacctgt ctggagtctt acctgggcct tggccctggc 169964447
aatggggaat ggagcaggca gcaggggaca gatgctgcca gaaaccgaga 169964497
tggtgccgga ggactgggct gagtctgggt caaatgacac cgccccaggc 169964547
tctctgccct ctggggtgag gcaggaggct gcctctgtgt gtgattcaga 169964597
gaccctagaa tcccagtggc catcacccca cagcacatgc caacctttct 169964647
gtgataactt tctcttgtgg aactgtgaaa gtgtaagacc agctcctgta 169964697
tagtgcatgg ccatcctttg ctttggggac agtaagtcag tcaacacata 169964747
cttataaatg gggtcctggg ccgtggcact gatctggtcc tcccaccttg 169964797
cctcacactg cccttcccac tcaccacttc cctcctctgc atcttagccg 169964847
caagggactt tcagaccaag cagacctgga atcaaatccc accgctgggc 169964897
ctcaatgcca gtggagacag gaacagctga tccctggagc cctcaggagg 169964947
aagaggacgg gatgcctggc ttggctgctg gtctggggca ggtgcccagt 169964997
tacagcagtt ggaaaaatcc tcagtgttgg aaggaaattt ggaagtgagc 169965047
atctacctgc ctgccgtgca gtttgtgact tttaagatgg ttgacagaac 169965097
attcccaaag gaccacagcg gtgaccactg ttctcgtttc cctttggtgg 169965147
ctcactcact cagtgctgga cacagtggtc ctgacaagac agtgctgtgg 169965197
cttccatgaa cctaggacag ggatagactc aaggactaag aacaaaccag 169965247
gaagaagcat caccacaggc tccttgccag tcacctcatc tcaccctcct 169965297
ggccctggcg gatgggtctc catatttaca ggggccagat gaaaaaacca 169965347
gaggagccag gaaaaggagc ttccccttcc caagggcgca aggtgaggtg 169965397
ccagtcatga gatgcaagcc ctgagctttc tgattccact gcatgtggtc 169965447
ccaaggttcg gcgccgcatc acacagttag tgagcacact ctcctcccct 169965497
ggccccgagt gagccagctg gatggcagat cagaaagaga agtcccgggt 169965547
gcccccaaca tggctagctc cttccaggac caggggctag gccccagcta 169965597
aggctggtgc acacagcagg gcagggggcg aaggagtggg atcccaccca 169965647
gggatcccac ccaccccaaa cctgctttcg gacatctttc caatgcataa 169965697

FIG. 1.96

```
tgtgcagatg aggccctttg ataaggacca aatccctttc cgttgcttgg  169965747
caacctggct cacaagtcat agcagggaag taatttacag gaattcaaag  169965797
tgtcgctgga ggttctgctg agctgaattg ctgcaaagag gaacctcaat  169965847
ggtccaaatc acacctctgg cggggaggag gggctgaagg aaaagcttcc  169965897
acttccgtca cttgagagta cagagccctg agctcagact cagcgatcgt  169965947
tttccattaa cggatttact ggttccatgt tgagctcctg ctgtgtggca  169965997
ggccctgtgc tgggagccag ggacacagtg acaaacgaga cagatgccaa  169966047
ccccggatgc acagagctca aagagacaga ggagtaaaca gggctacaca  169966097
tgtgacaaga taggctgtgc acaggggtct gagcaggacc cttggggcag  169966147
gaggaggcag tggagggatg ggagggtagg gacgcagtgg tgaccagcta  169966197
gccagataga gaacagaggg tgtcccagca cagggccaca caagcaaagg  169966247
cagaggtggg gagagaagag cctgccacac tctcagatca ccatgtggtt  169966297
gggccagggc cccagctgag gctgaggaca catggagccc agatccggca  169966347
gggccttgaa tgccaagtca gaaagcatct gaaatttagt ctacagatga  169966397
tgtgggttat tgacagccag gacagggaat gacatttgtg tttcaggaaa  169966447
accactgtct tcactgttag gggtagatt cagggagaaa caggaggtgg  169966497
aggggaagaa actgtgagta aaggagtctc tggggtacag gtgaagtttc  169966547
tgtgaaactg gagaagaaaa ctgttgaggc aagagttgac aaaacttgaa  169966597
gtaggatgga gaggaaggga caagttcccc tggcatggtg acggcccggt  169966647
ggtgggaacc agggaagagg aggggctttg caggtgtctg acttgcccaa  169966697
caggtggcgc catttaccaa gatgggaagg gccggggaga agggagggtt  169966747
ccattctagg gaaatctcag gtcctcgcta ttaggattct ttcggttgcc  169966797
agtgactgaa acccagctga aatggacttg ggaacatact ggttcatgac  169966847
atctggtgga ggtgaggtca gggtgcactg gagccctggc agcccactct  169966897
gatgccagag cccatgggga cagcggtgta tgttggacac agtagtcctt  169966947
caagggcggg gatcggagga acagaagaaa ggaacagcag atgccccact  169966997
gaggctgagc agaacattta ggatccttgg ccccatctca ttgtgccctt  169967047
tgctgtggct catctcacac ttgcagggag aagccaatgg atctctgtga  169967097
atggcgaggc tttgtatgca taaatgtggg ccattttgtc cccaagaatc  169967147
cctgggggtg aggaagccac agaaaattga ggtcctattc cctgctcact  169967197
cctggtatgt agtggaagct ggagagcctt tgtccaggca ctgacagcag  169967247
gaggtttcat gcagagctgc tcagggcatt tcccagatct gtcccacccc  169967297
tgggaactgg ctcagtggcc ttgccccacc agaagactgg gaactgcacc  169967347
caagacaggt tcagcccccc caggagagga cctgctggtg tgcgtgtcca  169967397
cacacagcac agaagcaagg aagatctggc aaacaacctt caacaaaaaa  169967447
gaggccattt gcactggcca cctgtgctgc ttctttcctg agcagacttg  169967497
gttctgagcc agggggtctc cctctttccc tcctccagct caggaaagga  169967547
ctcaggcaca tgtccaccca acctgcagga gagtgtggca cagcagtgaa  169967597
aggcctgggc ttcgcaggcc aacttgggtt tgatttttgg ctctgtgtca  169967647
caggcctcat gagatgtgct cacctcttag ctccctcatt tcagaatggg  169967697
gatgagaatc tgccatgccc ctgcccacca gccacctgcc caccctccct  169967747
tatcatgtgc cccgacctcc catgggtgct gctcatctga gtccctctgt  169967797
cctcactatg acggctggtc tgggaacccc tctggcccta ctctgcttca  169967847
agaccattta gcctctgctc ctgcttcctt attttcttgc tatttcccag  169967897
ctgcaatttc tttgcaagac agggaaagga ttggatatac tcagcccatc  169967947
ttaatttttt tactgtggga aaatacacat aacataaaat gtactatttt  169967997
aaccatttta aaggatgcaa ttcagtggca ttaattacat tcacaacggc  169968047
atgcagccat caccactatc tggttccaga actttctcat cacctcagat  169968097
ggaagccccg tattcactaa gaagccactc cccattccca cctcccccaa  169968147
ctcctggcaa ccaccaatct gctttctgtt tctgtggatt tgcctattct  169968197
ggatatttca tttaaaggca tcgtgcaata tgtggccttt tgtgcctggc  169968247
ttctttctct cagcaccatg ttttagggtc tatctacgtt gtagcatggg  169968297
```

FIG. 1.97

```
tcagtacttc aaccctgttc tttttttttt tttttttttt ttgagatgga 169968347
gtatccctct gttgctcagg ctgaagtgca gtggcacgac ctcagctccc 169968397
tgtaacctct gcccccctggg ttcaagtcat tctcctgcct cagcctccca 169968447
tgtagctggg attacaggca cgtaccacca cacctggcta agttttgtat 169968497
ttttagtagc gacggggttt tgccatgttg gccaggctgg ttttgaactc 169968547
ctgacctcag gtgatctgcc cacctcggcc tctcaaagtg gtgggattac 169968597
aggcgtgagc caccacgcct ggccacttca tccctttta tggctgagta 169968647
acattccatt gtgtggatat accacacggt tttgtttatt catcagttga 169968697
tgaacctttg gattgtctca cattttgacc attgtgaatc atgctgctat 169968747
aaatattcat gtacaagttt ttatttgaac acttgtctct aattctttgg 169968797
ggtatatacc caggagtgga atcgttggct catatggtaa ctctgtgttt 169968847
aacttattga gaaactgccc aacagttttc cataacagct gcaccattgt 169968897
acgatccctc aagcaaggtg caagggtatc agtttcccca catcctcatc 169968947
aatgttcttg tttttatggt ccttccagtg ggtgtgaggc tctttttact 169968997
ttttaatcac caggcagaga tctctcaacc aactataaaa tgattaaatg 169969047
actgatagcc tttgtgatca atcagactgg ctggagaaca ggaagatgag 169969097
aggagcctgg agtccctgac ccagaaggtg gccatctcaa atgtttttc 169969147
catcttccag ggctgtggac tgggcagttt gggacccggg aggggcaggc 169969197
cgtgagacct gtctagtgca catgtgcgac ctcatccgat cctcatagta 169969247
acacttacta aaattcttaa ccattacccc accagtctat gtccacacgg 169969297
ccacgctcac agccgtccct gcagtgtccc aggcccactc tcacttgttc 169969347
tttgcagaac ctcatgatga atgcagcatc cactgtttcc ttcttctgct 169969397
gctctggttc ccctccaccg aagcactact ttgtccaaga aactgctcct 169969447
tcccaccagg cagcgcccta ggctggggcc aaactagcca gtatcaacca 169969497
caggcttctg tcccctggcc tgagatcaga ttcttagctg cacagctgcc 169969547
cctgagagtt cctttcccca ggatgtgttc tcaagcgggc aatgcctcaa 169969597
gcctcctgtt gaggctagag gaaggaccac ctcctgttca ccagcatgca 169969647
cagactagac aggacggctc cgtctgtcgc gcttctgttg gtctctcatg 169969697
cccaagggtg tggctctggg atcagcctgc cctggttcgg atctacttaa 169969747
ttgtcactgt cactttcagc tcgttattta gcctccagtg cttccatttt 169969797
ctcaggggtg tagtgggatg atgaaaacaa ttcccgtttc gtagagtagt 169969847
gatgaagagt aaatgagcta atcccagtaa aaagctttaa ctcctgagcc 169969897
acagtaagtg ctcagtttat ctaagcatca ttatcaaaca taaacaatca 169969947
tttacagagt gatgaccacc gtatgctcca aacccagggc tgggggcctt 169969997
tcctacttct acagtgaccc ttagaggtga gcagtctagc ccccacttta 169970047
gggataatgt gacgaggtgc tgagaggtca tgatctccca gcagtgagtg 169970097
acagagcctg aggtgaaccc caaatctgtc tgactctaaa gttcatgctc 169970147
attccaatca tggcaaagaa aatgcagtgt cttctcacga agggttcatc 169970197
cctgcctcct cagtggctgt ttcaaggagg gccctttggt ttgcccagat 169970247
agactattca cactgaaagt gacaatggag aaactggcca ggacactcca 169970297
aggtcacaga gaggtttgtg gaggtgagat gagggtctca gccggcgggg 169970347
agggattccg gagggcagcg atccctaagg tggagccttc cagccacagg 169970397
atgtgtgacg agaaagtttt ccctcttctc ccctcacagc ccgcaacaaa 169970447
atctacatgg cttgccaata ttcttggaga atgaatttgg ggggctgtat 169970497
ttgtttccca tgactgctac aacaaattac cacaaactga gtgggtttaa 169970547
aacaatagac atttattctc tcactgccct gaaggctaga aggtccagat 169970597
caaggagtga ggacagaaga aggtaggcac tagaacttga cccagaagcc 169970647
tgtgacacac acacaccccca catccttctc cagcccccca ttatctgtct 169970697
cctaggaaca aggacaccac tacattcatt ccagaaaaga cccctttgt 169970747
ctgccagcca tcctcagagc cgaaaagcaa acctttgctg ctgagagctg 169970797
ctgatagaag agcaggaagc acagttaaag gggaacaggc tcccaactct 169970847
ggggcagcag atcttttggg cttcatgtca tagtattgta aagacaattg 169970897
```

FIG. 1.98

ccaaagtcag acaagatcag ttgtgtgatc ttggcaattc actttgtttc 169970947
tctgagcctc agtttactca cccataaaat ggggagaacc acgtctacct 169970997
gactgactcg tgatgaagat gaaattaaca caaagacaag gctgggcgca 169971047
gtggctcacg ccagtaatcc cagcactttg ggaggccgag gcatgtggat 169971097
catctgaggt caggagtttg agaccagcct ggccaacatg gtaaaacccc 169971147
gtctctacta aaaatacaaa aattggccag gtgtggtgat gggcaccagt 169971197
aatcccagcg actcgggagg ctgaggtagg agaatcgctt gaacccggga 169971247
ggcagaggtt gcagtgagct gagatgcact ccagcctggg cgacagggtg 169971297
aaactgtctc aaaaaaaaaa aaaaattaat gcaaagacaa aattagtgtg 169971347
ggaaaaccct ttgctcagag aaatgatggc cacaaagtca tattactccc 169971397
cccttactct gtaaaatctc ctttgctaga ggaagagtta aaagtccaag 169971447
tgggaagcac agtcccgggc ggaggcaggg aaggctatcc tggctctgag 169971497
tcgggctctg tctacctgga ttttgtgcct ccacgttccc tttcatcact 169971547
ctccaacagg gagatgtctg tctcccctca gtgtgatagt aatataatgg 169971597
ggcctcctgg tgctcctcag aatcacgtgc tctgggcagg aaaaaggtgc 169971647
aattctcctg cagaatgtac acagcaaaga ctggaaacga gaaaactgtc 169971697
ttccccaggg tggcttccta acaaatataa tgagaaggcg cttcctctct 169971747
tcctttcagt cacatgggga ggtcaacaga gagcaatgac tgtcctgagg 169971797
ctatttattt atttttgcc tgataataat tataataatc acttgcattt 169971847
attgagttgt ctgtgtcagg caccgggcta ggcacttcac tgcatgagtt 169971897
atcgcaagca atctttccaa agggattagg aagcaggagt tattttacag 169971947
atgaggaaac tcatgcatag agaggttgag tgtgacgctc atgttagcct 169971997
aacatgagga tccaagagct tatccattta ctcagacttt ttgattattt 169972047
tttgtgcaat ttcacagact tttggtgatg cataaaattt ttttagagta 169972097
ctagtttggg cctggcatgg cagctcactc ctgtaatctc agcactttgg 169972147
gaggctaaag cagcagaatc acttgaggcc aggagttcaa gaccagcctg 169972197
ggcaacatag cgagacctca ctaaaaataa aacaaaaaat aaaaaataata 169972247
caaaaaatta gccaagcatg gtggcacact cctgtagtcc caactacttg 169972297
ggagactgag gcaggaagat gtcttaagcc cagaaattcg aggttgcagt 169972347
gagctataat cacaccactg cactccagcc tggatgacag aacaagatcc 169972397
tgtctctaaa aacaaacaaa caaataaaca aatactactt tgctcattca 169972447
tttaagtcag taaattgtga caaatggaaa aatgcaagaa aaaaaaggaa 169972497
gctggacata aagctagaat ggaaaatgca tgagctcttg ctggggtggg 169972547
tcctaatttg gcttttagct tcctagcagc ccttgcaaag aagaaaacaa 169972597
gatctgttag gtaaatctct atagcagtgg ttcccaagac atggtctcct 169972647
gaccagcagt atcagcacta cctgggaacc tgttagattg tccctctcca 169972697
ccctcgaatc tgggagtcag gcccaggcat ctggtttaac gagcccccta 169972747
ggtgatgatg atacatgctg aggagtacga accacttatg ttagaataaa 169972797
tacacaccag cttctaacat tgatatcgca gagaaatttc tgcatgacac 169972847
agtgagctat tatattgacc aaatccccat tataaacacc atcatgtact 169972897
taataggcct ttttcttaac ttcctactta gcatacactc atgaaacctt 169972947
ctcaaggcac agcttaatga aattagttcc agaggcacca agctatgtca 169972997
cccagacaca cagcatgatg ggctggtttc atgctcatgc acacttctga 169973047
gtagtgaaag cctggagaat atcccagcat tgctgttaga agccaggact 169973097
ctggagccag gctgacccaa atttgaatct taggtgcacc tttcattaac 169973147
tgagtgacct tggccaattc ccttaattcc ctccctctgc ctcagtttct 169973197
tcatgtataa gaggaaaatg actattttat gtattccatg gagttgctgt 169973247
aaaaattcaa tgggctaaca gaccgtatgc ttagtatggt gcttagtatg 169973297
ctaatgagtc cttataaatg ttcccacgat tatgaactgc tagagtgtgt 169973347
ttcctgtagg taaacctcca agccatcaaa cctatgtcca tgtctcctgc 169973397
caccatctgt cctggatgat tattgttcag atgcatattc caaacttact 169973447
gagtacctag tatgtgcggg gttctttcac ttatatcatt tgcctttaaa 169973497

FIG. 1.99

```
cagctctgca ctgtagttat tattacccat tttctgcatc aggaaactga  169973547
gttcccccca aaatgaactg acttttcaaa agtcacacag gtattaagtg  169973597
ccaaagccag gatttgattc caggccttct ggcttgacag tggcactcaa  169973647
attcatcaag tgtttcttga ggatcttgca gatattttct catattgcaa  169973697
ttctagtctc tgattttta gccccagctg ggcaggaagg aagcaggtgc  169973747
atcagttttt agaactagag caggacagat gcttagaatg tatctggttc  169973797
aagcccctag tttatagctg tgagagtcca ggctacaaga gggacttggc  169973847
ttgccctgga cccaaagagc taagcagaac aaatactcac atttggtgct  169973897
gctcatttct ctcccctggg ccccacagca tcttcgaaag gtgaggtcaa  169973947
ttcccatgaa aagtaccaca ctacgaagtg cagccaaggt ccagaggggt  169973997
atggcagaga gcttagggtt aattgattag agcaggaaaa ggtcagaaga  169974047
tgtggaatca tccacatagc ccttgcaagg aggtatcaca tacatccact  169974097
cagggtcgaa gacacagaca gcatgtgtct ctctagcctt ccctctctcc  169974147
tggagtccat agccttggct gcctgccagg aacccggcac acccacctcc  169974197
caacacctcc caagcccact ccaccttcct caaagggtaa cctcttcctg  169974247
acctaatcgt tttcagagga aagagcagga actttggagt caggcctggt  169974297
ttcctaatca tcatattggt caaagcaagt cacacagcca agcccacagg  169974347
cagtggggct gggaaggaca gagagagaag ggagaatcgc tactgaatga  169974397
cagtctacca cacctattgt gcaaagtgct ggaagggagg atttgttcat  169974447
tcattctgtt aatatatatt aactgaacac gagccaggca ctggcctagg  169974497
tgctgaatat gcagcagtga atgaaataga cagaagtact tttcctcctg  169974547
gagttcatgt tcaagtgaat aatggcccca cacctcgatt aatccacaag  169974597
cacttaactg tctaccctgt caggtttcca tatgtgccag acacatcatg  169974647
tccacaagag attctctgca accagcgagc tcatggccca cggggaaacc  169974697
agacagacag acacccaatg acaacattga aggcttgcac gcacgagggg  169974747
ccagaaaaca ccccacatgg agtgggtccc actctaggcc actctcccat  169974797
cccttccctt ttccaaattt cctccctagc cacatgcctt ggtttccagg  169974847
gccagccagc tgtgcaaaat gcctagcaag ctctcagcag gcccctgctg  169974897
ggcacagcac agagaaatta agtgcaatta gcgtaactaa gccatcacca  169974947
gtaagaggca cttgctctcc tggcggctcc ctttcggaga ctaatgggga  169974997
tgactagaga ggaggatcca gagcctatgg ctgaaacctc atcaacagct  169975047
tgggagagtg acagccagcc agtcttctgc ccgcaggctg aagaggcagt  169975097
gcttcccagg gtgagccaga ggtcaggaat cagaaggcct ccccagagct  169975147
cgctcccatt ttcctgagtc taggaagatg gagtaaattg gtttaatgga  169975197
gtggagtccc gttgtcatgg tggcaggagg agaacagacg gatcgccctg  169975247
ctccagcctg acaatgtgag gctgggcttt tagcaaatgt ggccggctgt  169975297
aattcagaga actcaatttg acccatgctg tatcttcttt cagataatgg  169975347
ccgtgtgtcc tgcccttccc ccaagtgggg caggctagaa acctctagtg  169975397
gactcctcac cccctcccaa gacccagtca atctataggg cccgctggtt  169975447
ccttccccca ggtctctcct ctctccctgg attgtggcaa tagcctcctg  169975497
aaggttcctc tgcgccccag ggctaagtcc tggtcccatc cgctcttcac  169975547
atacacacac ccagcatagc acatttttct agaactcaca cctgaacgtg  169975597
cctctcctct gttgaagaca tccccagaag ctgatccctt tgttcccaat  169975647
gcccttccac cctgtctcca cctggcatat gcctgtgttt ccctgaaatt  169975697
ccagcttaaa tctctctcca tgtttggcct tctctgcctc ttgctggatt  169975747
cctcatctcg cctcccaccg gttttgcatg gatccctgcc actacctgtg  169975797
tgtgtccatc gctccatcca ttgagcctgt gaggggaaag cctatttaat  169975847
tcattgtcac atcccttccc tggagacaga gtaaaatagc taataattag  169975897
acaaaacatt aattgagtgc ttattttatg tcaagtgtga tttgaggact  169975947
ttatatgcac taatttattt agcttcccaa aactccatta ataggtacta  169975997
ttaatgcccc ctacttgaaa gattaagcaa cagaggcatg aaaataataa  169976047
agtgatatgt ccaaaactac acagctaata agtgagagag ccaagatttg  169976097
```

FIG. 1.100

aacctgaagg agatgggagg gagagaaata gttggggaga ccacagggaa 169976147
aggaggaaga agagaaggga agaaaaggag gcggggaggg ccgggagctg 169976197
gaaatgtacc tttgtatttt aagtcattga gatttggggg ttgttactgt 169976247
cacagatcct agcctgttct tactaataaa ataaataact aaatttataa 169976297
agaagtgtca gaaaaaaagg tcatattaga ccacgaagga tgacaaagag 169976347
cttcttaaaa agggaactca aggcccaaac atgggtattg ttgtgtcatg 169976397
tgaatccttc acaggggcca cttggtgtct gtgtggctgg ctctttgtgg 169976447
ccctggagag ggaacaagca tgaatgcatc agtggcttcc agcctgaaca 169976497
gaataagttc aacaagagat ggccccagct ccggtgtcta ctggggaggt 169976547
gatgaagtga agtgttcaat tcctgcatag ccaccaacaa gtccctggaa 169976597
acacaattgt tgaggatgtg tccctcgggg aggcatggtt catctggctg 169976647
tgtcacaaag cagatgggaa cagctggcga ggaaggactg cctgtcctgg 169976697
gaattgccct aatcatcttc ctaaatattg ccgcagccag gaggaaagcc 169976747
tgattccctg cagatggggc cattgacagg atgctactgg tccgggttgg 169976797
gagaaaagga atgctgtaaa cacagtcagc ccattcggca ggcagtggaa 169976847
gctgtctgag gcttcagggc cccctcctca ctaggggcta taattcatgc 169976897
agtttcttat ctgccagatg gccaggagga cacatgcatt ccagtggtgc 169976947
catcttctaa gtgttggcag cttgccagtg atctcaactt cattttcatc 169976997
attgcctttt gagacttttt gttcttaatc accccaacca accatgaaat 169977047
tttaatacca gaaatatatt ctctgtttac atactttatg caaaatctgt 169977097
tttttaaacg taaaaagggg attttttcac acgtgcattc ccacaagaac 169977147
caattctctc ccccgttgag aatgcctgtt gtacactaaa ccttcagata 169977197
accattttct gcaatcagcc ctatcagatt tggagggaga gaagcaactc 169977247
accaggaaac aaatgctctt tgcattgttt tgtctcttcc cagaagcctc 169977297
ccatccacct tcagctggag ttgagctttc taacatcact gcattcctgc 169977347
acatccacat taccatcttt atgtatttga ttcctccttg agggcaaggc 169977397
ctgtttctct gttgtttaca ccccctctca gtgcgtgctg taaggtagga 169977447
gcttcacaga tggttaaagc aaaacagaac atgggccggg tgcagtgact 169977497
cactcctgtt gtctcagcac tttgggaggc caaggcgggt gaatcacctg 169977547
aggtcaggag ttcaaggcca acctggccaa atggcgaaac cccatcttta 169977597
ctaaaaatac aaaaaatagc tgggcgtggt ggtaggcgcc tgtaatccca 169977647
gctactcggg aggctgaggc aggagaatca cttgaacccg ggaggtggag 169977697
tttgcagtgc gccaagatcg cgccactgca ctccagcctg ggcgacagag 169977747
tgggattcca tctcaaaaat caaaaaacaa aaaaaggaaa aaacagaaca 169977797
tgaaagccac tttcccacag cctgggcacg tagctactgt ggtgaatcac 169977847
ctttcctggc agagcacact caggaaccgt cagctccaaa agcaccaaac 169977897
agtttcatta agaccgtggc tccttcgcag aagcacacgg aacgcagact 169977947
gacaagcctg tgataacatt ttaatggcct gagttcagtt cccaataaaa 169977997
tacttaagtt tctgcaatca tggagctggc attttcatta atactcctga 169978047
ttaattgtct gtcctaggaa aaggctcatc accgtcacaa tcccgatctt 169978097
gctagttcct tgcagggaga atcccagcag cctgggcttt tccaccaggt 169978147
taaagctggc aaagggcaag gaagactccc tggcacctgg taccctccac 169978197
ttgccatggt aacagaggat tacaggctct aagcccagct gctgtccttg 169978247
cattcagacc tcaccactca tacactggga cctggaacta cttaaattgc 169978297
ctcagtttct ttatgtgtca aatggcgttt gacacataaa gcactaatac 169978347
taatagtact tacataataa ggttgttgta aggattaatt gagttggtac 169978397
aagtaatgtc ctggcacgca tctggcacat agtgagtgct tcctataata 169978447
aacagtagct gggtttgttg ttgttttact attatttttc ctccagaaag 169978497
gcgagagttg catcagcctt ggaagaggca ggactgagat gtttgggaac 169978547
aagaccactt tcacaggggg cagccttttg agaaatgtca tgtctacttg 169978597
atagggcttt aaatatggag tagtgggaat ctgcacattt ggattcaaat 169978647
cctggctttt ccaatggctg atgatggaac ccttataggc tcaaatcact 169978697

FIG. 1.101

cacttctctg agcctcccca aaaattgaga ataacagttt ttattccata 169978747
gggtagtttt gagaattggt aagatgatca taaatgtaga agggcctggt 169978797
actcataact gttttcttca tttatttatt tagtcaacaa tgttttctga 169978847
gcacctaccc tgggccaggc acactgaggt gggccttggg attcatcagg 169978897
gatcaaaggg aaaaggcatc ccatctccgt ggagcttcac atcatcgtag 169978947
ttaaggtgga taatgactgt ctcgacagat aggacagtgg ccaggacaca 169978997
ggccttcagt ctggagcatg cttctcattt tgaaataatt tcttgttcag 169979047
agtcaggttg gaaggaaggc cttgcagggg ctgggtaagg atggcggcat 169979097
ctctgcgttc acgtctgtgt gctcaccatg agagcccacc tctctctggc 169979147
ccaagtttcc ttctgtaatg tgaaagaggt ggggttccat gctctcctct 169979197
tcagcatcct ccttagatac tcaatctggc actcatcagt ttcggaccct 169979247
ccatgctgcc ccaaaggaag ccacactgca ccttcatcca gtttcttaaa 169979297
cctgcatgtt ctctcttgcc tctagacctt cgcccaggct attccatctg 169979347
cctggaacat gcttccatac acctgccttc acttggctaa ctcctacttc 169979397
tgccttgtgc cactgcttgg attgaatgtc ctctggaatt cagccttcct 169979447
ggatgtccct gagctgggct agggtcccct ctgcccacct ctgctctttg 169979497
attttccctg ttcatcaccc cagttatgac actgagttgt aactgggatt 169979547
tctaatctgt cgcctccacc aagcagcaca ctctttctgg ccagggtcca 169979597
tgtcttattt gtcttggtat ctctagggcc cagaatctgg tacctagtga 169979647
atgtgtaaca aatattttct ctgagctaaa ataggaacac agggtccctg 169979697
caatgaagac cccaggtctg gaggggaaga caaggtagca ttacaagata 169979747
acaggccttc cctgcaaagc gtcagcactc agactggggc attgtggaca 169979797
agaagggtgg agaggagaga aggcatgaag gcatcccaga tagggacaca 169979847
gcagaaacaa agacaaaaag gccggataag caagatctct ttgagccggc 169979897
aggttaagat gggtagtgga aagctggacc actgtcaggt tttgacccct 169979947
ccagacaatg caccgtgatc ttctggcttc catatgtccc tggctgctgc 169979997
tgcctgctgc ccactgaggg acctcaccct ccagactcta agtgatctta 169980047
agccaccagc cttacaaatt acagcagaca gagggggtcc aggcccttct 169980097
agagatagtg ttcacagcac tttcccaaag ctggttctgc tcaattccct 169980147
aaaagatctc ctgcaatggg gcctccaggg tcctaaaagc accatctgct 169980197
cttaaagagt ctcactgctc attagcatat caaaggctct gaaatgtcct 169980247
gcaggaaaaa actctgggct aacttttgta gccctgttcc ccaaactaaa 169980297
ttgaatgaag gattcttttt ttatgaccca cctacagttc tgcagagatc 169980347
ctccagggaa tgcagatcta acccattctc tgtgcagtga atggcagaga 169980397
aaattaaagt gattgcatct attgcacact tacttttcct tcgaggtagg 169980447
tgagagagta aataagatgc aggagagaat tacaaccgga gatataaaac 169980497
agttgtctta cagggaatag tctgtttgcc cagggaggag gttttcagaa 169980547
tacaaagtac catttcttct ccacgacatc cccaggggag aaaggaaagt 169980597
gaaagaagcc ctccaaccga ccactggaga tgggagcatt tctgctggtt 169980647
tcatttacat aagtgtcctt ggcaatttgt cccaatttgt ctcattataa 169980697
atgatgtaaa catccgggcg taatcacaga caaaatggga tggtttaaat 169980747
gctgcctgat taaaaaccct gggttggctg caatgacttg caggcatgct 169980797
aacggcttcc ctgcaaggga ctttggtttc aaagttctga gagctcagga 169980847
gggtccctag gtctagttgc aaagtcatgt cccccatgac tctgcaactc 169980897
tccacataga gcctagcaag aatgcatcat cttctctata tctcttataa 169980947
ggagggaagg aagaaaggga gggaaggagg gagggggaga gggagggaga 169980997
aaggaaagaa gaaaagaaag gaaagaagga aggaaggaag ggagggaggg 169981047
aggaaaggag gaaggaaggg agggagggag ggaggaaagg agggaggagg 169981097
gagggaggga gggagggagg gagctaactg acattttccc ctttgccatc 169981147
tgattggcat gaagggcaat gtaactgagg agtctgggga ccaaagtgaa 169981197
tcctagtaat gtcactcact taatatgtgt gattttttag accaatcaca 169981247
tcatttggcc aagcctcagt ttcctagtct gtcaaatggg aatgatgatt 169981297

FIG. 1.102

```
tgacatctgg tgtgtctctc actactgttg agacattata taatgagagc  169981347
atagcccttt ataaagacag ggtttctgtc ctctttctta cttcattctt  169981397
tccttctctt ctttccttct aatagaaggt atagagaaga cagcacattc  169981447
ctactgagct ctatatggag agctgcagtc atgggggaca ctgtctagat  169981497
ctggggaccc tcccaagctc tcagagcttt ggaaggaagg tccctgcagg  169981547
gaaactgtgt gtgtttcttc aacagtgtat cctcagtgcc tagcacatgg  169981597
taagtgttcc ataaacagct gttgaagaga cggatggata actgaatgaa  169981647
tggatgcttc catgggcaat gacacactaa tctgaaaagc cctgtatcaa  169981697
tgaaagaatc acttaatagt ttaacttttc cctcatcctt cagaacacag  169981747
atggcatgcc atcttccctt caaatctctt cccagtgccc cacacagaag  169981797
aggcacactt ggacactggt gtctgatgga cccaagttca cagcctgtct  169981847
ctggtcatca ggtatcatga ccttgggcaa gaagcttaac tctctgagcc  169981897
tcagtttccc cttctgtccc ccagggaaaa tgagtcctgc ccctcctaag  169981947
ggaggtatga gatgtaagac cccgaaggac acaaaggttt gccaggagcc  169981997
ttcaggtagg aggcaggtaa ggaggtctgc tagattggaa tgagtttctg  169982047
gaaggcccca aggagctcaa aatcagacct ggggtgaagg tgtcttgacc  169982097
aaaatgagac ccatcaaaga agcctggatg aaggtgccca cagcatccat  169982147
cagtgccaaa aacagaaaca ctttagccca ggatacaagg aacattttaa  169982197
agcaacagag ataagagata gttagaactc aggcctcctg gctcttgctg  169982247
ttcttggccc ataattagtt gttatgggac cttaataaac ttcttgcctt  169982297
cttggtacct ttgccaaaca atctgatgag gagaatattg agtcatggtg  169982347
ccagggaaaa ttagcatatt ctgcaaattc ctggcactgt taacactgga  169982397
ttctgtccac ctttagaaat cctcagatca ctatgtcagc atcccccaat  169982447
cacagctctc caacttcaag gagggttgag gggtctgaag aaggagagag  169982497
aggcaacaga gccagaaacc cttcagaaga tgccaagagc aaggtttgga  169982547
cccatagtcc accacttact aacttcaaga gtgttatgag ctacaaactt  169982597
ctcagtctcc gttgactcat ctcaaaaatg gaagtaaaat tatttaccat  169982647
gcaatatgtt gtcaaaatgc attgggttta gttcatagca ggtgctcaaa  169982697
gaatatcagt tccacttccc ttgtccctag agagccttgt agtggatgtt  169982747
gatgtgtctt ccaacacatg caccaacctt tccctgtcct gtagcagttg  169982797
agatggaatc atcccactcc cagctccagg aataggctct gatgggcttg  169982847
aacccagcag cttaattcca ttggttctct aggccttcat cattagtaca  169982897
ggaaaggcac ttgacctaaa ttagttcgat aagatttaag ctcagaaatc  169982947
tggtttgttg gatggagaaa gagatgcttt ctttctctct ggaaggagtt  169982997
tattgcaaaa gtaagggctg gggctgctac agccattgtg ctaccatgag  169983047
ggaactagcc atgataacaa aacttgcctg gggaggggct acgcatcaca  169983097
gaaaatgatg ccaaagtcct gctcaaactg tgcctgatgc ctgcctgatc  169983147
tatggacttc ttagttccat gtaatggatt ctctctattt ttaaagccgt  169983197
atcaggttga atttttggag aaataaaaca aaaagcatct tgactaattt  169983247
aaaaaatctt ctttgggtat tcaaccctcc taaactcacc cccaaatcca  169983297
ctgggagcat gtcaagattt ttgtgagccg atttaggaga tgcaaattca  169983347
tttgccttaa ttggatctcc aggaaatgac ttctgccccc tcttaaatca  169983397
tttaaagctc aaagaggcat gagggccctc cccaaggatg caggtatcct  169983447
cttgactgac agcctgtatg ctctgcttcc aggatccttc catctcctcc  169983497
ctttactgag ggagtctgct atgtgttaga ggtgtccatc actggtcaca  169983547
ctgggaagct gtggcaggga agctggagaa aaagcaagat aggccccaga  169983597
aagaacacca actccagact cagggagact caggccagaa tcctagctca  169983647
acttcttcca agctcccaaa gtcacactct tttctctgag cctcgatttt  169983697
cccatctgca aaatggggat actaagggtc acctagctgg gctgccctgg  169983747
agattccaag acattaggca tagaaacagt ctggcctaga ccctgtaggc  169983797
cagtaggcat ttgatcaatg gcagctgtgg ttgagatttt tatcatcatt  169983847
atggctgccc ttcctgcttt ccagggctag tgtagatcta agattatagg  169983897
```

FIG. 1.103

ggctgcaacg ttcctcagtg gagcagatgc agcaaggtag taagagaggg 169983947
cattctcact tgtccccaca gagtgtggtg tgggggagat ctgtgagcac 169983997
cccagcagcc atgagggtca gcacttgaat ctctgcaggt cagtcatact 169984047
cctctttatt atttttattt ttatttatgt attgatttat tgctctgtca 169984097
cccaggctgg agtgcactgg caccatcata gctcactgca gccttaaact 169984147
cctgggctca agtgactccc acttcagcct cccaagtagc tagagccaca 169984197
ggcacatgcc accacgccta gctaattttt caatttttttg tagagacagg 169984247
gtctcactgt gttgcccagg ctggtttcaa attcctaggc ttgagtgatc 169984297
ctcccgcctt ggactcccaa agtgctggga ttacaactgt gagccactgc 169984347
acctggcctt attcccttct ttttatcagt tttcaaagcc atcagtatgc 169984397
agagcactag gcccagaaat gagaggagaa gagagatgga acgacgaaga 169984447
ccaaaacctc tgtcctcaag ctgctcataa gccagtatag agacgtgtgg 169984497
agtctgctgt cctgagttcc agtcccagtt ccccttgcaa gcagccgtgt 169984547
gacttgcagc aagtcattga atccctttga gcctcacttt ccttgtctag 169984597
aaaacaacaa aactggaaat aatactgctt cccttccagt ttgtcaagga 169984647
tgaaggtgct ttgcacggtc cctggagcaa aatgtgttct caatcaagat 169984697
tccgtctgtg gtgggtggag ccgcgtcctt cccaaattca tattcactca 169984747
gaaccttcaa atgtgacctt tttcagaaat agcatctttg caagtttaat 169984797
tcagttatgg gtctcaagat gaaatcatct tggatttggg gtctatccga 169984847
aatccagtga ctgatgtcct tataaaaaga agggatacag gccggggcca 169984897
gtagctcacg cctgtaatcc cagcactttg ggaggctgag gcaggcagat 169984947
cacttgaggt taggagttca agaccagcct ggccaacatg gtgaaacccc 169984997
gtctctacta aaaatacaaa aattagctgg gtgtggtggt gagcacccat 169985047
aatcccagct actcgggagg ctgaggcaag agaattgctt gaacccagga 169985097
ggcagaggtt gcagtgagcc gagatcgcgc cactgcactc cagcctaggt 169985147
gacaagcgtg agactctgtc tcaaaaaaaa aaaaaaaaag agtggataca 169985197
gagaggcagt gaagaaggct gtgtgcaaag acaggcagag gttagtggga 169985247
tgcagcgcga ggctaaggag tgtctggggc caccagaagc cagggaagcc 169985297
taggaagggt tttcctagag cctttggagg gagcacagcc ctgctgacac 169985347
cctgacttca gactcccagc ctccagagct gggaagggat aagtagctgt 169985397
tgctttaaac cagtggtccc caaccctttt ggcaccagaa accggttttg 169985447
gttcagtgga agacaatttt tccacggaca gggtgtgtgg ggtgggagat 169985497
ggtttcagga tgaaactgtt ccgcctctga tcatcaggca ttagcattag 169985547
ttagattctc ataaggagtg agcaacctag atccttcgca tgcgcagttc 169985597
gcaatagggt tcatgctcct atgagaacct aatgcggcgg ctgatctgac 169985647
aggagcggag ctcaggcggt aatgcttgct cgccagctca cctgctgtgc 169985697
agccggggtc ctaacaggcc acagacccat ccgtggccca ggggattggc 169985747
gacccctgtc tttttttttt tctttttttt gagatggagt ttcgctcttg 169985797
ttgcccaggc tggagtgcaa tggcacgatc tcgactcttc aacctccgcc 169985847
tcctgggttc aagccattct cctccctcag cctcccaagt agctgggatt 169985897
acaggcaccc gccaccatac ctggctaatt tttgtatttt tagtagagat 169985947
ggggtttctc catgttggtc aggctggtct tgaactcccg acctcaagtg 169985997
atccgcccac ctcagcctcc caaagtgctg ggattacagg cgtgagccac 169986047
cacgacctgc ccggggaccc ctgtcttaaa ccaccccagc ctgtgatact 169986097
ttgttatggt gaccctaaga ggcaaataca ccctcctttc cccaacctct 169986147
cccctcagac gaaaccgatg cgaaaagtgc ttcatgaagt ttcaggtaaa 169986197
gaagtctggg acgaaaaggg atagtgagga tggcgggagg ggctgaactc 169986247
caaatgggct tatcaaggct ctgcaaaatg gcgtgacggc gctgcccccct 169986297
tctggtggcc tgaagactaa cgcacatgat gtcaagtgcg gggcccaagt 169986347
actcaggaaa aggttctcat ttggacactg ggaggtctta cattgggggc 169986397
cctgagcctc cagcccttcc aaatctattc tcagcaggag ctcagccaca 169986447
cctgtgtccc agaactgagg ccaggcccag ccttcactcc acgcccagcc 169986497

FIG. 1.104

```
agccccaagg aaccgactcc ctgaggctct atgctccctg cctccagtgg 169986547
ccccgtgtct gggaaatagt ggccctggcc tgatgccctg acctgggcaa 169986597
tccatcccct ggtcctctca gctcccgggc ccaggtttc tgggctactt 169986647
taaccagggc aaactcattc ctcgagtaca aaataaaaga ttcgaacagc 169986697
ataatcaaat aggtcatacc cataaatcaa cacatttgag cacctatttt 169986747
gttgttcttt cactaatcca aaccatattt attgagcatc tactatgtgc 169986797
cattctccag tagccattct aggtgcaggg gatacagcag agaccttgaa 169986847
aaaaggaaca gtctctgatc ttgctgagct tagagtcaag tggaggtgag 169986897
gaggaaggaa atgaattaac aactaagtga agcagaaggt aaccaattga 169986947
ttgactgacg aaggggtaca aacaacaaac accttccttt ctccaaactc 169986997
tatctttaac tgtattctct cgttttcctt cctctccatt ttacaatcat 169987047
tttacaacat ctctggctat tctcctatat ttctgatcac ttcggttctc 169987097
atcacaataa taatttcagt tttcaagcat tggaaagtcc catccaatta 169987147
aaatgtcaat ctcacacgca gtttaaacgt ttcgcctgcc cgtgagctca 169987197
gacctgtctt ggtgcctcag ttcttgtgtg gaggggagga gaggagaggg 169987247
gaggggagga gaggaaagga gaccggggag gtgggggggg agaggggagg 169987297
ggaggagagg ggaggggagt gggggagaag gggagaaaag cgcagctggc 169987347
ttcctcactc tcctttcctt cctcaccatc cttaccctgg cccagggcag 169987397
gaggaggatt ggcagagtag aggcagggtc ttctgtctta gctgggcctg 169987447
ttggtgactt tctgttggcc aacatgggct gactggaatg ttctccagca 169987497
tggcacatgg tcatccagat gcaggctctt ccctggggca ctatagcaga 169987547
gagggctctc ttccagtcta ttgcagatgg atgccctcgt gagctgagtt 169987597
ttgatgaaca tcccatgtcc ccagccaccc cattcagagc ctctttctac 169987647
tctggtcctc tggtcccagc agcagccctc tgggtactga ggggagggca 169987697
tctcacccaa gccccttaaa cctgctcacc ttcttcagag cccacgtggc 169987747
cgcaggaaag tcacaaaccc ttgtgctccc acagggcaca cgtgtgcaca 169987797
cgtgtgcagc taccttctct ctagttggta cctgaggctg cctcctggat 169987847
tttccagtct ctgtgttccc agacaacccc aagccccaag aatacaagag 169987897
ctctgtcacc aagcatcggg cctgtggctg cactacacgt ctgcagctca 169987947
ggacccctgg ctgcggcgta agctaccagc atccccttct catgggcacc 169987997
ctcatctccg gctccccatc gctgggctgt gacctgcggg ggcgcccctc 169988047
tatggaaggg aaggagaaaa attcacagtg ctatctactc ctctgaatgc 169988097
actcccacca atttccttgg aaatttctag ctttcactga catatctggg 169988147
atggggcggt ggtcacaaaa tcaatcccac tttccctcgg ctagtcttac 169988197
aagcacccaa cagctctatt cagaatacag ggctgcccag ctacttccca 169988247
ttcattatcc ccaggttgca agctttagtc aaaacccaga ggcagcaggg 169988297
tgtctggttc cacctgctgt taggatgatt tcaggagtgc aaagtgttag 169988347
aaacgcggta aaacatgatg cttagagatt aagtgggatg gggactgggc 169988397
agatgatgct gctttggacc cagcgagtga ggtgagactg cgacaagaca 169988447
gagccactga gcagtgacct gggggatggg cattgcaggc aaggcagaac 169988497
cccaagtggg aacaacctca ctgggcttag caaaactaaa gaggcccaaa 169988547
gtatactgag cgatgaggtg agtggcgtgg gataaggttg gagaggaggc 169988597
tggaaccaga ccctgcaggg ccttgcaggt gatgggaagg agtttggaag 169988647
gtgctggaag gtttgaagca gaggagggat atgatcatgc ctgtagctgc 169988697
tatgtagaac aactgtatgc atgccaggcc tgtgccacgc atgctctaat 169988747
cattactggc tttaaccctt gcactaacgt tgtcatgcag gtaggagcat 169988797
ctgcacccag caaatggaaa ctgaagctca ggaatattca gtcacttgtc 169988847
caaggctccc cagctgttag gtgctaaggc tggattcaat ccaggacttg 169988897
cagactccag tatcttggct tttctaacga gagtgtgcta gctttctaat 169988947
gggggtgggg aaggcagtct gccccctcc catggcaccg tgagcaggtg 169988997
tcactgctcc agccagtacg cctggacacc gactaggaag gagtatgtgc 169989047
tactaggagg gatggtctgg gctgactctt tgaagttgac aaggagttgc 169989097
```

FIG. 1.105

ataatcccag ctaataatta tgctggacca ggggcagaga cattactcca 169989147
agggtgacca ggtgtggaga agaggctgct gactccgggg ccccaggacc 169989197
tggcccccag gtctcattgc ccgagtgctg ccccagaagg agtagaagct 169989247
ggagctgtcc gggccacagc cgaggctggg tgaatgctgc agtgaggctg 169989297
ccgcacaagt tgcgtgttgt gacatttgtc ttctggaggg gattgggatg 169989347
ggctacttca gcatttaaaa acccctacta ggtctgagaa atcccctcag 169989397
cttatgagcc tgggtgggca gcaggccttc tcaagaagcc cagaaggcca 169989447
gatgctcact tcccaggctc tcttgcggct gagctgagag caggcacctg 169989497
aggcctggca agtgtgacag ctggtgacac agacagacag ggacagggag 169989547
atgggactgt gcctgcagcg gtagccctgg ccggtgttca gtggggccag 169989597
catccgtgtc tttcctgggg gccagtgggg gccgtggctc tgacgatgca 169989647
tccctccccc acgttttttc tcttcttgtc ttggactttg cagggagcac 169989697
tctgcttttg ggaacaggag ctgggtctct ggccattctc cgcagcccct 169989747
caccattcac tcagtggctc tcaaaaaata gaacctgggg caaagctgtt 169989797
cttggcccca aacaacatga ggaaaaataa ataaataatg tacctggtaa 169989847
ctgagagagt tccctctgca tcttgggctc tttcaatgag atgtcctctg 169989897
cctgcagcaa gccccaaggg cttccctcac caggaccagc accctggttt 169989947
gcctgacccc acacctgcca atgccggggc aagaatgtcc caggctgccc 169989997
tggttcccag agctgatgct tcccacagtg cccagctgtg ctggcatgga 169990047
gctaaggaca gggccagtcc caagaaaaca acaaggctcc agggccaccg 169990097
gccactgctc aggaccctgg ctgaccccac agatgcggag tgcctgagat 169990147
ggctcatggg tgacccccag gcatctggca aaggtcacaa tggctgtttg 169990197
gcttgaagac agcccttgca agatctgttt tgagccaacc tgtggcattt 169990247
agccctccct gggtgacaaa taaaaggct gaggcttgta ggagccaagg 169990297
tgggagtccc catctacccc caccctctca gcccaccagg gcccagactg 169990347
gggaactgct cctgcttcga gggacagggc tgaagaggag aggggcttgg 169990397
ggctcccctt gatcccaaag ctccagggac cccaaagaaa cgtatcagca 169990447
gcatgagaat atcgggtgac ctctctctct agtaaatgtc aaaactttta 169990497
accaaaatgc cttcatcccc cagcgccagg cctgagctaa tctcataggt 169990547
gtcaggactg ggagcctgga cccctcttcc ttctgctcct gctttgcaga 169990597
gaagtgagtg gggaattccc gcctctggga attcagagac gaagtgacag 169990647
agacagcatt ggaagataag aatgcagcca aagaggtctt cagggtagcg 169990697
tgtggcctgg gcgctgagac tattgggcct agcaacttct caagcagtct 169990747
attaaccaca gccggtagcc agcttttccc cgcccttctc ccaggcacac 169990797
acagccacct ccatcaccaa aggtcaggcg aaccacctcc catggctacc 169990847
cccagcctga cttgctttat agaaatcatg gcatctcatc ctcacaacag 169990897
cccacactca cagtgaatct tggccattat gacaactggg gacactgagg 169990947
ctcggagtgg tggaaattct cagaatcaca taacaataag tgttaaagtc 169990997
agaatttcaa cttcatctct ctaactccaa agggcgtgtg tgtgtgtgtg 169991047
cgtttctggc cataatcata ttgtgcccta caagccccag tgaggaatct 169991097
gctaggaaca ctggtttggg gaaaaaatgt aataaaatat gtgatccaga 169991147
aggcggcctt ggtacctgtc ataaaccgca gcatggggta ctcactatgc 169991197
ctggggtctg ggctctgaag gcatgattga atgatctcac tgcaggcctg 169991247
gttgtcctgc gaagacaccc gtcaatacat gaatattgac acacaacgct 169991297
gcagtgcacg cgcttctggc aggggagctg ctgcactcga gggcagctca 169991347
aggttaattt gcagggttca tgtttggagt ttctgagcaa gtgttgcagc 169991397
tttggccccc agccccctga ggggagctct ggccgtgcat gagggtcaga 169991447
cagaaaatct cctttcctcc atccaggcct gcagtctgca gcactgaggt 169991497
cagcgctggc cacaagccca ccctgtgcct cgtcagcccc actgagcctc 169991547
tccatctatc atgccacagg ctgaccctga aatgcaaaat cattctgtcc 169991597
tcccgccctc cactcccacc tcgcacatct atggatttgc tgttcagaaa 169991647
acatctgttc cctccttcgc ccctgacata cgcatcgatc tcatgctagc 169991697

FIG. 1.106

ccagctgcct aagctcacca ctctgggaga cagactctca gtcctcatca 169991747
gacagagatg tagggggctg taagggacgg ggtgcaggta gggcctgagg 169991797
attccgacaa ggtgagccat gggcaggggc attgttcatg cagggacctc 169991847
ctggccaagg tcctacgtca aggttagaag gaaagagtaa atgatcggat 169991897
aggctaagac agcaactcag caggccaagg gactcctccc ccaggacctg 169991947
ctccaccctt agaggggtcc cggacagcca agccctgatg gagttggtca 169991997
gcaaccaacc agccctgggg ccaaggcctg cagaagcaga gaggaggggt 169992047
ctcaggcagg ccagaggtgc tagctgggat gcctgggtcc cccaccccac 169992097
cccagcacac tgtcctttct ccaggtgctc agttagattg agctgggtcc 169992147
catcttgggc ctttgctggt ccctccctag aaagtctgcc ccctcccct 169992197
gcagggtggc atcagcattc aggcctggcc ctgacgccct cctctctggg 169992247
ccaccttcac ctccacaacc ccggcaccag cacccatccc caccacatcc 169992297
ccagcacgca gcatctagta agggcaccaa atgcatgccc agacatatga 169992347
gtgaaatgaa ttaaccctga acctgaaaaa gggcaaccac cacacaagat 169992397
tctctagaaa caatgtgaat tgtgcagaag gaaattaacc ctactccatc 169992447
cagcccatcc taaggcaggg acttggacct gttcctcttg atggggctgg 169992497
ggctgaggcg ggcaaggcag gcaagtgctg aacagttggc aacattgccc 169992547
atcccgtctc cctgcaccag gctgggcctg gggtgagggg gtgggggccg 169992597
gggtagctgg gctcctccag caaagagcag gactgagtcc ctggtgacta 169992647
ttaggtaaaa ggtccctgac aattttgagg ggccagatgc caactcgagg 169992697
gatacagaga agatctaggc acagtctttc cccaccatgt cagacaaaaa 169992747
ggttagatac aggacctgat atgttataaa actcaatcaa tatttactta 169992797
gtgaataaat ggacggatgg atggatggat gcattaggca gccaagtggg 169992847
cagcaccgat gacttaatgt actgagtgct ccgactccag caacatgcat 169992897
tcattgttcc tactgtgtgc cagtgaacaa gagcaatgaa ctcaatgact 169992947
tctgcccagg gtgggccagg gaaccaggga agactctcca aaaaggcagc 169992997
atttgggctg ggacgtacag atgagtaggg ggtcgagtgt gtcgttatgt 169993047
cgctggagcc cagaggcgtc catcaggact tgggggaggg cagatgaaag 169993097
ggccttactg cctaacttgg agccactgta tgtttcaaaa caaaggagag 169993147
agaggatcct gggaaagaga aagggtactc taggcagagg atgtgaatgg 169993197
gcacagcaca ggtgagaaca tcaagaccag gggtcaggga atctactggt 169993247
aaacaattgt accccaaggg agcaatcaca gcctctccat ccacagggaa 169993297
atgcctggtg gggaggaatg ggaggaaaga aacagattgc atgactgtgt 169993347
cttgaaggtc taattccaga gtacagcatc acccctatct tccaggtcca 169993397
gaaactgagg ctcagaggga gactttctga tgagtgcagc gtgcagataa 169993447
gagcatctcc aaagctacct ccttccccag tcacaccagg gcataagcaa 169993497
ctgataacag ctgtcagcac gggacagtgg agggaacact aggttaggaa 169993547
taagggtacg aggcttgagt acagattgtc aatgactcag tgtgtgaact 169993597
tggtcaggtg actccaacca gatgacttcc ttctctgagc ttctgttccc 169993647
tcctctatga atggggacaa tcactcagct tcacaaaaca atggctgcga 169993697
aattgcctgg tacaagagag agaacttcca gtgtgtaggg gctgttgtcc 169993747
taactgccca gccccctaga taggtagtta tgtcatctgt gaaatgggtg 169993797
ttagaattcc tacctcccag gacagctgtg ggcagaaaac caaagaatgt 169993847
gtgtgagagc ccaagcacca tgcctggcac atagtaggtg ctcaggaaag 169993897
gctgagggtg cagctgctgt ccacacacat ggtaccactg ccccaggaag 169993947
gggcttcagg aaccaagagc aattctgagc actggtgact ggactctgcc 169993997
attctccatt tcaaacgctt tttgaaagca gctccagacc caagcaggag 169994047
agcaggaggc aaaagaaacg caggggcttt cccgaatgga attttagaaa 169994097
cacacagaat tgtctcctgc acagaaggga agctgtcttc cacagcacag 169994147
agccaccagg ccccagactg ctggcttatg tatttgtcat tgctcatcat 169994197
gaatggatgc caggaaagtc tctttgtgat gggggcacaa cccctcaaat 169994247
ctcctcccct ccagatgcca tccactggag ctgagactcc caggtcccct 169994297

FIG. 1.107

```
agggcttctc tcccaggggc ctctgggctc cccaaggcca cgtgctgccc 169994347
ccactagaga cctgggccag tcctgaccag gggaaagagt agcgccgaca 169994397
acagccccag atggtatgtg cactggcaca tactggcagc tgccttcatg 169994447
acagcaagcc ataggtccaa atcccgcccc ttcacaggga cattcccaac 169994497
tggtcagggg tggacctccc cttcccggct gtctttggtg tccaggacga 169994547
tttgccacag acagggggag ctaaaggggc ccacgcttga ggccgctcag 169994597
ctctgagtcc tcgccggcca cagaggacct tcgtgcctgt cctctgtcct 169994647
cctgcccagt ccccaggcca ggctcagctg gagttgggga gcagaaaaac 169994697
acgcatctga atcaaggctc tcggagcctt tgcttctgcc tccaagaggc 169994747
gagggaaaat gaatacccag gcgagcgagc aagagagacc ctcagaaaac 169994797
cccagatgcc cctggaatca agccctgtcc caccaacgcc acgtggattg 169994847
acaggctatt agtcttcctg taattaggat tctcgcctca aatcttgtat 169994897
ctttttcccc cagaagattc tcctccagcc ttcaccactg ccccctggcg 169994947
cttccttgca aggcttttga agaatccttt gcagagaagc agcctccttt 169994997
ggcaggggct gcagagcact ctgcctccct aggccagggc gaaccaacag 169995047
aggcgggaga tgaggaggag cagcgcggct ctgctgcgtg gccctgggca 169995097
agcaccacaa cctctctggg ccgtttgcac attcttaccg ccagggatgt 169995147
gggcggtaaa tgaaagagac cagcacaaac cagtgtcagc tcccttcctc 169995197
gattcctaaa atgtgatgcc caaagatggg ccagcctcct gctgtgcctt 169995247
ctctgggggg acatttaata agtggaagag ccctggctct gagtcaggct 169995297
agaatcccag ttctgcactt aaccagctgt gtgacctcag gcaagcaacc 169995347
tggcctctct gaacctgagt ttcttcatct gtaagtggga acgctaatgc 169995397
tgtgctgagg gttccatggg acaaccatgt aaaagcaccc agcacgcacc 169995447
cagcaggcag caggtcctgc acagcgttcc ctcgcgtggg ggtgggttgg 169995497
ggcttgagca cgggttgaac ctggaagagg ccatttccct cccttctccc 169995547
cgaggaataa ttgtgaattc ctgggtctca gaggaaacat ccgctttggt 169995597
ggtcagaaag gacatcctcc tttgagcagg gggagagcag agggaagggg 169995647
gttgcgaggg tcacgccttc cccaggcatt ctcggggtct ctccagcaag 169995697
gatggaggcg gccaggggct tgggcggtgt ggggcgccac ctggcgtcca 169995747
gaagaggtaa gacaggcgga gcgggaccct ccgaagtggg aggaggacgc 169995797
tggtcagggg aggaggggac cgcgagagcg agagcggaca ttctaccaaa 169995847
cacatggaca acacagaaga tgaggaaaat gagcagggca gctagtcata 169995897
ggagcaaatt ttaaaaatta agtgactgag gtagtcaggg ggcctcactg 169995947
agaagtggct tggagtaaga cctgaagttg gggactggat atgcagatgt 169995997
ctgggaggag agcttttcag gaagaagaat cagccagtgc agaggcctat 169996047
ggcagaccca agcaggaggc aaaagaaacg cagaggcttt ccaggatgga 169996097
aaatgaagaa tcagccagtg cagaggaatg tgcctggatg tgttccagga 169996147
atgtttcaga atgagctaaa aggccaggga cagagaacta agaggagagg 169996197
agaggtcaga gagatggcgg tgggcggaag gagggggcgg ggcggaggag 169996247
ggggcgaggg ggcggggggg cggagggggg gacggagggg ggggcggggg 169996297
gcggggcgga ggggggatgg ggcggggcgg ggtgtggctg tgcgtctgga 169996347
taagggttgt ggcttttatg ctgcacgaga aggagagcca ttggagagct 169996397
tggggcagaa acaagagctg atgacatttt aatccctctg gctgctgtgc 169996447
tggggtagac tgtcagggcc aagggcagag tgtgaaaagc gcccaagagg 169996497
cttctacaag aatctagtgg gagatgctgc ggctctggcc aggttagtgg 169996547
cagtgccagt ggtgagaggg atgtggttct gcgggtgttg tgaaaatgga 169996597
gccagcggga tttgttgaca gaccaaagtt gaggtgagac agagactccg 169996647
gaatgactgc agggttattg gtctgagcag ggttattggt ctgagcagat 169996697
aaccagatgg agtcaccact aacttagatg gagaaggctg gtagagtgag 169996747
gaaatatcgg gaacttatgt tcggacttgt taagtttgag atggctggga 169996797
gatatctaag tggagagggc aaggaataaa atgcttccta aactccagca 169996847
tccattcagt cccctggaga gcttgttaaa ccggatggat gggtgccacg 169996897
```

FIG. 1.108

cccaccccctg caccccctgag ttgcaatagg cccaaaatga ttcaataggc 169996947
ccaacatggg gcccaaggtt ctacatttcc aacagcttcc caagtgatgc 169996997
caatgctgcc agactgagaa ccacacttcg agtagcacca aagtaggcaa 169997047
ctggatgttt gaggctggca ttcaaaagag agatcctggc aagagataga 169997097
attttggagt cattggcacg gaaatccaca aaacgacatg agctctccca 169997147
gggagtgtgt gtgtgtaaag agggaagaaa agagcattga gtcccgagcc 169997197
ccaggctctt caatggtaag aggttggcag attaggaagg accagcaaag 169997247
actgggatgg gaaaccactg aagcaagagg aaggccaggc agatgtgtcc 169997297
tgaaagccaa aaagagaaag gtcatcatta atatgataca ttttgcaatt 169997347
tgtttatatg taagaggaga ttaatagctc atagcattcc caggcattgc 169997397
tgttaggaat tgcagctcca ggctggcaac ccttaaatca caaactagat 169997447
tgtcaagagg actgcctgga attccagctc tgtaagtaat atgctgtgtg 169997497
gcctcagcca ggtcacttca cctctctggg cttctcttgc ttccatatat 169997547
aaatgtaata agaaaatctt ttatttatta tttatttatt tatttttgag 169997597
acagagactc gctttgtcac ccaggctgga gggcagtggt gcgatctcca 169997647
ctcaccgcaa tctccgcctt ccgggctaag gcaattcttg tgcctcaacc 169997697
tcctgactag ctgaaattac aggcacccac caccacaccc agctaatttt 169997747
tgtattttta gtagagacgg ggtttcatct tgttggccag gcttgtctca 169997797
aacacctgac ctcaagtgat ctgcctgcct cggcctccca aagtgttgag 169997847
attacaggag tgagccatca cgcccggcca agaagacctt ttaaagtaga 169997897
tgttctaaga gtctctttca gttctgaatc tctttgttat cttacatgtt 169997947
acccccctcag agatgccttc cctcactccc ctgtccaagg tagctctcca 169997997
cccaagtcag cagtcatcac agaaccatca caacctgaag ccctgtgcat 169998047
gttgctgttt atttcctgtt tacatcacaa cctgaagccc tgtgcatgta 169998097
gctgtatact aaccctagag ttagtatagc ttagttaaac tttcatttat 169998147
tgctaaaggt ttatcactgc tgtctctatc agcctccctg cactgtaagg 169998197
gacaaggggg caggtccagt ttctgtcttg tttcaggttt tgtctccagc 169998247
caagataagt atctttgcaa ggctctgttt ttattctgaa aggaaattag 169998297
gagctattgg agggtatgga gtggaagggg acagtcttct gccttggatg 169998347
tataaaaggg atgctgggcc acgctgatgg gctagaccat ggcaggcaga 169998397
gaaaacaggc aggaggccag gcaggggctg ccagtgccca gacacaggcc 169998447
gggaggtgca ggtggcagtg gcaggcagtg gccaggccct gggtatattt 169998497
tgaaggtcaa gccaacagga cttgccagtg ggctgggtat gggcatgaga 169998547
caggcaagtt ctcccagatg tgactccgat gtgacatttt ggagactccc 169998597
tcaacaccca cctggggaag acagaccagt tgggaggaaa tatctggagt 169998647
ctcattttat taattctgag agtttgttgt attagacagt gaagcggaaa 169998697
tgtcaggaag tcagctggaa ataggagtct ggagttgggg ggaaagccta 169998747
gccagagaca ggaattgtgg cgtcattggc gtagagacag cgtttaaagc 169998797
tgtgacgcta gatgggttca ccaggggaat gagagtcgaa agagaagagc 169998847
agagcagagc tgagccctga gggggcaga aaggcacaca gggacagtgg 169998897
aggcaggagg cagaaggcag agggtggcgg gccaacagct ctgaaggtca 169998947
gtgctctatc acaggggggt ggccgaggag gggcccgagg ctggaaccag 169998997
gaggcactat cccaggcctg ccttctcatg ccagcagcag tgatctatcc 169999047
tcaaggagaa tattgattga gcacctactg catgcagaga cctcatcaat 169999097
ggctcaatca atatgacacg gccacgcttc ctgatccgag ccctctgagc 169999147
aggtattttc catcctggac ttatccctgt ttctcaggag agggatggac 169999197
ccaagagaca aatagttccc ccaagatcgc acagcaagcc agtgtaaaac 169999247
aagcatagaa accagctttt agggggctca aggtgggggt cagaaaatga 169999297
ggtgagagca agcatttact gagcacctcc tgtaaatatc tcctacatac 169999347
gaagtgctct acccacatta ctgaccaccc aataaaggca ggtcctgtaa 169999397
ttcccaattt gcagatggat aagcagaggc ttaggggtgt gaaacaacct 169999447
cctcaaggtc atggcttcta agtggtggag ccaggcctgc aaaccaggct 169999497

FIG. 1.109

gtctgaatcc aaaatccacc tccaagtcca cagtgggttg gccccacccc 169999547
caacccatcc ccatcaccaa caggacggtg gtcagagtcc actgaatgaa 169999597
agcatgcgtg cattcaaaat agacagccaa tcagcagcct tccatcagaa 169999647
atgtcatctt tatgacaaca gcatcgattc caggcgtacc ctgcatatgt 169999697
gaaccaaggg ggatggtgga ttgtcctttc caagcacttc ccagcccctt 169999747
agagtcccac aggcccagaa ccacggccct tgacaccctc tacccacccc 169999797
tgctccccct tctcctcaga ccccgagtgt ctggccaggc tttctcactg 169999847
ggaagtggcc actccatcca aatgaccacc gcacccctcc tcaccagctt 169999897
ccctgcttct gccctggccc ccactctttg agtccattct tcaaccagca 169999947
gacaaagggg tgctgtacac gcctctgcac agaacccctc caatgccttc 169999997
tgtctcaact cagagcaaag ggcagcagct agcacactcc aaacactccc 170000047
acccacacct cagctcctcc ctctgtccct ctgctctatt ccctcagatc 170000097
tgacggctcc atcccataaa cgtggcacac acacacctgc ctcaaggcct 170000147
ttgctcaggc tgttcccact gcctggagca ctcttcctgc agacacccac 170000197
gaggctcatt ttcctttagt gaggctttcc tggccgcctc ttccagataa 170000247
caactctcct ctccttccct gccctcctgc tcctcctgtt cgcgctacat 170000297
aacagactct gtggggcctt ggtttatgta tttccttctc tcccctactg 170000347
aaatacatgt gagcgatgct ggggcaggcc gactagaaga agcagactat 170000397
ctgcttcttc tccaccctta gaatggtgct gggcccagaa gaggcatgca 170000447
gtcgatattt gctgaataaa tgaatgtcag ataaagtggt gtggggactc 170000497
caggggaaag atttgtcatt ctccaccctc ccagttcagc ttaaagcaga 170000547
gaagtgagag gtgcccaaaa aggggtgtgt ctgggggtg gggggtgggg 170000597
atgttccaag atctccaagg cctggatttt aagcaaggtt tgagatgcca 170000647
gcaagagggc ctggcattgc cagattgata gtctgcattt cagagaagga 170000697
caaccccacc tctgacctta gcccaagcct caacagcctg ctcaaggaga 170000747
tccaccctta gtaggaggag gcagccaggc caggttccag tccctgccac 170000797
cgcttgccag gtgtgtcttg ggcagcagtt gcctttgctc ggtggtcttc 170000847
agctttgccc cctgccaggc acgtgctggc ctcctgcctg catcgtagct 170000897
catggagtcc tctcagtcac ctctgtatgc cctgcagcat ccccagttct 170000947
cagtgagaag agtgtgctct gaaagttaag taacttaccc aaggtcacac 170000997
aaggtctgag tctcaaatgc atacaatttg accccatagt ctaaggtctt 170001047
gaccgcaatg gaataagaaa ttattttacc attctgagtg gcagtctctg 170001097
aagactacag caataattga tgcctctcag ggggataggt gtgtcactta 170001147
caggtgatag tgaggttgtc ctcagcctcc ctgctcttcg ttagacctcc 170001197
ctcctcctct ctacccgggc caagcgtcca aggcaaccct gtgtgttgca 170001247
ttgctcttgg gggcagccag tccccccacat aaagtggtgt cttccttcag 170001297
ctcctaacaa gtcatgtggc cattgcccac actacaacga cagaggaagc 170001347
ctcaggggaa ccctcctcct ctcccgaatc tccgggcttc ctgcatccct 170001397
gggaggcaat gtccattaat tccagctatg accagcagag ggcagcagca 170001447
gcctggggaa gacccagagg cccaggccta ggggagaggc cggtgtctcc 170001497
accctaggag ccccaattcc tccgcagcag gagcagacac acaaagagga 170001547
gggcgagcaa gggtcctccg gggcggaaca cctctgccgc acctgcagca 170001597
gccttgctct atttcttcac aagcttcccc atgacactga cccaaggctg 170001647
tctggccact acagctgctg atgatgatta gcaataataa taataataaa 170001697
cgaaatgcct tctgcttaga tcatctttaa tttcccctcc agaatgacat 170001747
tcgactctgc ttagagttac aggcagccca gcaattactg agcgcaaata 170001797
ccgtgttcac ccgcctcacc tcatccacgc ccccacaaca cccagccctg 170001847
agactggctc cacgatcacc tccactttat aaaataagat atcaaactct 170001897
gaacagaacg gacgtctcaa aaaatgggca tattacattt aaaccctcaa 170001947
tctgttgggt atttgagtga aatggacata cctccaggga gtcggtggcg 170001997
agggccggct ctgaggactt cctgggttgg gatcctggct ctgcaggact 170002047
gcgtgacctt ggtgagttac ttcatccctc caaacgcgct gttctccttc 170002097

FIG. 1.110

```
atagaatgga gatgaccaca gggccagatt cataaggttg ttccttgtaa 170002147
tacaggtgaa tatccatacc cagcaactgc tggaccacct gtggtttcaa 170002197
ggataatttc cctcccacgt ccccgtggcc cttggaacct tcctctcctc 170002247
ctgtctcccc ctgcccccat cactttgtaa ttgaaaagtc atgattgctc 170002297
tcccaggtgt agcactgctc acaggtcaga ttgcctgctc tgacgtagtg 170002347
actcagttgg atgcggttca gctgtgtatg atcaactccc tccccctgac 170002397
aaaaacatta ttttgcatca cagagaagtt gatttctttc acacataaaa 170002447
gaaggcaaaa agtggtgcct aaagggctgg tacagcagct tcaagaaatc 170002497
aggaagaacc tgggctcctt ctgccttctt gttctgccaa tatcacccca 170002547
tggctgccac ttcatggccc aagtggaacc atggagcacc accttcaga 170002597
cccataggtg acaacagcct gctctgtgag agtggcagtg gcttccagag 170002647
agacttagga agtagaatca acaggacttg gtgacagatt tgccacagag 170002697
ctggggaaca gggaggtcca acggtgactc ccaaggagct gatgtgagaa 170002747
ccagagctgc tgtgaatatt gttcccaact cctgagacag ggacagtggt 170002797
cccgtggcta ggaagtggta ggcagtagag agtcacaatg cacattagta 170002847
tatcaacatt gtgagtaggg cacgcaggga agaaacctgt tcaacccagc 170002897
cccgtgctag aaagacatca gcagggcctg caaaagccct gattaaatct 170002947
cacaagtttg cacctggagc cgccatcttg aattgcaggt gaatatcagc 170002997
ctttggtttg ggctgtgtgc cccagatgat ggtggtccca aattacatag 170003047
gccaatatcc agagctgggt taaaatgaag catttcgagg aaaaaatgc 170003097
aatgaaattt gtttaaccgg tacttcaggc ttttgagcac agaacagcgt 170003147
ccatccctcc aaacacacac tgaggatata cacttagcca ggagggaaca 170003197
taaggagggg tggacaagcc atgtttacta aaatctctca gtgtgtgcca 170003247
ggcatgttca tgtatattca ggaagaagtg tcagtattta agatcctcgg 170003297
cccttgcccg agtccccaac acgccttctt gtctggagaa ctgtaaatct 170003347
tggaaacatc ttgcaagggg ggacacctca cagaaggcag gcttggcatg 170003397
ggataaacag aatcgactcc tctgcttcct tctgatgcac agtgaatggg 170003447
caggtggaag catcgttgct taaagaggaa ccaaaactcc accccagagc 170003497
tgctaattcc ttttggcttg cagttatgca gagggctaaa aaatccaacg 170003547
aatcacaaat cccctggttg ctaagtagaa agaatatgtt ttggctgctg 170003597
ctgttccctt ccccaaggaa aagattcaag cagaggcggt ccccacctct 170003647
caacacagaa agcaacatct ctgattgcct ctagacacac cttcatgctc 170003697
gtggcacttt gggaccctct gcccgctggc ttatgggcat ggcttcccca 170003747
tcactctggg tccttgggaa gagcctcttt cccagacccc acctctgtgc 170003797
ctcatcacat ttctcccagg ctattgactt gttcaaggtt aaggtatgaa 170003847
gagagtcatg cagcagccct acctggctct gctctgctgg gggaagcctt 170003897
ttcagagcct gcctcttcct cagcatgagg ggctgctcgg gcccagtccc 170003947
agaggccatg ctggtcccag gggaaggtgg ccgtcatccc catctgtgtt 170003997
ttctcttgca ggtaagtcat gctccagcag tcgggagggt tgtgtgatga 170004047
cacacttggc agtttgggag caaaagccgc cacagtaaga cacaattgat 170004097
tcattgcctc tcaaccctct gctggggtgg actttcatgc gtggacttct 170004147
gtccccaaag aggcttctct gggtctggaa agggccctag ccttggttgg 170004197
gggaggcaaa ggggtggcgg cttccaggta ccatctggcc aggaaccggc 170004247
tccattgtct gtgcatgtag cttgcactgg gctgcctgct ccaagggagg 170004297
catctcccca cgatctacga cattggcttc aaagagctgc tcctggcagc 170004347
ttcgaatggc tgagacctac tggcatggga tggaggagtg cagggagctt 170004397
cccgggacct cgctagtcct gcctggatgc tcagaaggcc ctcgtcctcg 170004447
gtggcatgca gcctcggcca tttccaaact cacggcatct cacccagcca 170004497
tgtcacccac ccccggctct gtcgcccttc ccatcacctt tctcccaccc 170004547
atcacctcac atcaaggttt cagccagcgg gaaccaggtt tagactccaa 170004597
ttacctgtgc gtgtgggagg ttggattgtg acatctttgg agggccgggc 170004647
ttctgaagcg acatttgatt tctggtactg aaatgtcaaa gggtcctgag 170004697
```

FIG. 1.111

gcacccgcta gggcagcacg cggagcatcc acctgcgtgc gcatcctggg 170004747
ctctctctgg gccacttggt gctggggaca tgccgggagc tggtggtcag 170004797
ccctcctcct gcctcctcag tgctgcatct tcaccttctg cagctgccta 170004847
ccagaagcag gggacctgg aaggcaaagg agagggagtt ggcatgtagt 170004897
gagcaccgac tgtgcacaca gtgccagcaa ggagcttcac actcatctcc 170004947
agcgtcacag ctgcccagtg gctgtggaag ccgatggact gggccctctc 170004997
ccagtacaca atcattagag ggtctcagtt cactgagtaa ctgtgggagc 170005047
agcacggtgc ctccatcagc ccccagttct gctttcgaaa catcgtcacc 170005097
atcgccaaag caaagcctca gacctgcagg ccagcgctcc catgccccat 170005147
agccgggagt aaaggacaga tgcggggaat ctggaaggag attcacttca 170005197
agcaccatcc cactctattt gttaaacttg tgctcctgtg aaaactgctt 170005247
gtgtctgcat caaacccagc tagggagggc tgagggctaa gggtaaacct 170005297
gggagagttg aattccagtg ctgtgattaa aaccaatatt ccacataatg 170005347
caatgtaact tgctcacatc gtcccatgta atctttaaag ccacagccct 170005397
tttgcaattg ggattattat ctccatttta cactggagga aactgaggct 170005447
ctaagaggtg aaatgattca cccagttagg aagtgatgag tccagatgtg 170005497
gtagactgaa taatggccct cacaatggaa cctgtgagtg ttcccttaga 170005547
tgacaaaggg cctttgcaga tgtgattaaa ttcaggatcc tgagattggg 170005597
agacattatc ctagattatc caggtgggtt ctaaatgtca tcagaagtgt 170005647
cttcataaga ggaagacaga gattttgcta cagaagaggg ggaaacatga 170005697
tgatgagtca gaggctggag tgacacctgg aaggggccat gagccaaggc 170005747
gtccaggtgg ctggaagcca gaaaaaggcc aggaaatggg ttttctctgt 170005797
gagcttcccc aggaaaccag cctggccaac accttgactt tagcccagtg 170005847
caactgactc cacatttctg gctccagaac tgtaagagaa tacatttgtg 170005897
ttttgttaag ctagcaaatt tgcagtaatt tatgacagcg ctatgagaaa 170005947
ccaaaacacc aggattatgc cccaaggatc ctgatgccct ccctcctctc 170005997
tgctctgcag tgtgctggag ctcacagggc tctgctgctg ggagttagta 170006047
tctagtccaa cactttaccc actcaccccc caagctaagg gactcctgaa 170006097
atcagggacc agatgcataa taggtgccca ggaagtgaga ctcgccttcc 170006147
ccagattaag aataaagaag acaaactatc cacggctgct gtgagcctct 170006197
catcagacct cagcttctag ggcagggtcc ctgcctgtct ccagtatgtg 170006247
gcctctgtgt cttcttcgcc ctccatcccc acagtgggac gagaagtcat 170006297
caggaaggca ggggatctgc aggcagccat cagggctcta attgcagctg 170006347
gctgggggac catgggtcag ggctgccacc ccctggctct gtgccttcac 170006397
ctgtgtaacg aatggggcac tcacagcccc tctcaagtgg tcctggggat 170006447
gaagtgagaa ggtgacatat acaagtgagt tatacacgtt cctgttctgt 170006497
cactcaccag tgctcactgg gtgggtcact gaactcccct cagcgtttcc 170006547
ttctccatct gtaaaccacc agtgcaaacc tttcccagat agtgctgacc 170006597
cgaagcagga accagtgccc ctctgccctc agtaagtctg ccagcagagg 170006647
aagcccatag agggtcttgg gaaatgaagc caacagagtc aagagggtca 170006697
gatgatgagg gacttcaagt gccaccttca tcccattctt tctgcaaata 170006747
ttcaccacac acctacgtga cctcaggctc tgtgtcaggt cctggggatg 170006797
taatggtgtc catgaagaaa caaggtccct gccctcatag agtggcctga 170006847
catatgcccg aggcagtcag cagccgagtg cgggagactc ttgagcagag 170006897
attgagtgtg ttgatatctg taggcatcag cctggctttg ctgagtgagc 170006947
tatatcagag tggaggaggc cagaggcaaa gtccagactc cactggatcc 170006997
tggattgagg ggagaagggg ctgggcggag gagcagcctg agcacctgca 170007047
tctcactcca actgggtgct gatttgtccc catggcccca gcacccaggc 170007097
aggtcaccaa gtaagctcaa gacaaaaatg atgagtgact caacagtgtc 170007147
tggggacaag ggagggagag aagaactcaa aatgactgag gtttccagct 170007197
accagaaaaa tggaaggacc ttgaaacaaa tgggccatca gcaggggaca 170007247
ctggctggaa gcccagagtc cagtcagctc tgtaaggccc ccagaatagg 170007297

FIG. 1.112

catttgactt caagtcacag gcatttcagc aaaagcctct ttgctacagt 170007347
gattatggtg aagcagatgc ccacagctga gatgggcaac tctcaggcct 170007397
ccagtgggga cagagaatcc ctgggcccca acatagcttg gcctgaagat 170007447
ctgagtcagg catccaacct cttctgctca gctctttcag gaagatgtgt 170007497
atactggcct ctcttgccgc aagggtccac caccttcctt atgtgtgacc 170007547
taaggcttct agtgctggct cagtggctaa tttgagcata agcacccttg 170007597
ttggtaaaat gaaggatagg tgtagatcag catttcccaa agtgtgtgct 170007647
tctcagaaaa ttaggtccct ggttgtctgt agaggttact taacaaagag 170007697
actctgtagt tatgttagaa ataaatctta tgattaccag gattagtctc 170007747
tttaaagctt gtctaggtgg gtcacaaatc cgcctcagtc aggctttaaa 170007797
tggggaacag ggtttaaatt ggatttaaac atttaaaaac catgctaaca 170007847
agaaccaaaa gaaagtgaga gtagctacat tgatttcaga cagagcagac 170007897
ttaaggaaca ttgttaggga taaggatgga tattacataa taacaaaggt 170007947
gtcaatactc caagaaaaca taacaatcct taatgtgtgt gcacctaaca 170007997
accgagggtc aacatacaga agacaaaaaa tgatataaat gcaaggagga 170008047
atacatcagt caactgttac acttggaggc cttaacaccc ctctaccaga 170008097
aatggacaga tccagcaggc agaaagtcag tcaaggcata gctgaactca 170008147
atgacactat caattaactg gatgtaattg acatctgtag gctactcatc 170008197
caacaagagc agatatcgta tttttctcaa acccacatgg gacgttcacc 170008247
aagataggcc acattctgag tcattaaaca tacttaacaa aagcaaaata 170008297
ataaaaatca tacaatgtct gctctcaaag cacaatggaa tcaaactaaa 170008347
aatcaataac aaggagatag caagaaaatc ccaaaatact tggagattaa 170008397
acaacactcc taaataacat aggtcaaaaa agaaatcttg agaaattaaa 170008447
aaaaaatact ctgaatcaac tacagatcac acaaacatca aaacaataat 170008497
aaaggaatat tatgaacacc tctatgccca caaatttgac aacttacatg 170008547
aaatgaacca attctttaaa gtaaataatc tgccaaaatt cgcacaagaa 170008597
gaaatagata atcttaatag ccctatgtct attacagaaa ttgaatcaat 170008647
aacatccttt cgaaacagaa agcaccaggc tcagataggc tgattggtga 170008697
attctaacaa atatttaagg aagaaaatgt atcaattctc tacaatctct 170008747
tctagaagat aggaacaaag gaaatatttc ctaactcatt ctatgaggcc 170008797
aatattaccc taataccaaa accagacaaa gacatcagaa aagaaaacta 170008847
cagactaata tctctcatga acatagatgc aaaaattctc aacaaagtat 170008897
ttgcaaattg agtccaacaa cgtataaaaa gaattataag ccatgaccaa 170008947
gtgagattta tcccagttat gcaaggctgg tccaacattt gaaaatcagt 170008997
taatgtaacc catcacatca acaggctaaa gaagaaaaat catataatca 170009047
tataaacaga tgtggaaaaa gcatttgaca aaatctaacc cccagttgtg 170009097
attaaaactc tcaaaaaaca aggaatagag gggaattttc tcaccttgat 170009147
aaagaacatc tacaaaaatc ctccagctaa catcatactt aatggtgaga 170009197
aactagaagc tttcctacta aggtacaagg caaggatgtc ccctctcact 170009247
cctccttttc aacatcatat tggaagtcct aggtaatgca atgagacaac 170009297
aaaaggaaat aaaaggtata cacataggga agggaaaaat aaagctgttt 170009347
ttgtttccag atgacatgat tatctgtata gaaaattgaa aagaatcaac 170009397
aacaaaaaca aaaacctcat gtaactaata agctattata ctgaggttgc 170009447
aggataaggt taatatacaa aagtcgatca ctttcctata taccagcaat 170009497
gaacaagtag aatatgaaat ttaaaacaca ctaccattta cattggtaag 170009547
gtatatccca aaatgaaata cttataatct aaataagtat aaatcaaata 170009597
acatatgtac aagatctata tgaagaaaac tacaaaactc tgatgaaaga 170009647
aatcgaagaa gagccaaata aatgaagagt attccatgtt tgtggatagg 170009697
aaaccttggt attgtcaggt tatcagttct ttccaacttc atctatagat 170009747
taaatgcaat cccagccaaa attattggtt attagcaact attaacaaat 170009797
tattttatgg atatcaacaa agtgatttta aagtttacag agagaggcaa 170009847
agactcagaa tagtcaattt aatactgaag aagaagaaaa aagttggagg 170009897

FIG. 1.113

attgacacaa cctgattcaa gactaactct aaagccatga taataaagac 170009947
actgtggtat gggtgaaaaa tagacaagta gatcaatgga acagaacaga 170009997
aagcccagaa atagacccac atgaatagag ttgactgatc tttgacaaag 170010047
gaacagaggc aatacagagg agcaaagaca gtttttcaa caaacagtgc 170010097
tagaacaact ggccatccac attaaaaaaa aaaaagagtc cacacacaaa 170010147
ccttgcaccc ttcacaataa ttaactaaaa atgggtaata gatctaaata 170010197
taagacacaa aactataaaa ctcctagaat ataacatgga atcatatcta 170010247
gaagatcctg agtatggcag tgactttcta gatataacac caaaggcaca 170010297
atctgtgaaa gaaataattg agaagttgga attcattaaa atttaaacct 170010347
ctgccctgta aaaggcaatg ttaagagaat gagaaaataa gccacagact 170010397
gggaaaaaat atttgaaaaa atatatatct gataaaggac tgttattcaa 170010447
agcatacaaa gaactcttaa aaatcaataa ttagaaaatt aaaaatctga 170010497
ttcaaaaata agcagaagac ccgaacagac atttcaccaa ggaagatata 170010547
cagatggcaa gtaagcatgt gaaaaaatgc tccacatatg tcattaggga 170010597
attgctaatt aaaacaatga tgagatgcca ctacagaact catagaatgg 170010647
ccaatatcca aaacacttaa caacacaaaa tgtaggtgag aatgtggaga 170010697
aacaggaact ctcatcagtg cttcgtggga ctgtgcaaaa cagtacagct 170010747
gctttggaag acagtttggc agtttcttac aaaactaaac agacccttac 170010797
cataagattc atcagtcatg ccctttggta ttcacccaag tgaaccaaaa 170010847
acttgtgttc acacaaaaaa ctgcatgtgg atgtttacag cagctttatt 170010897
cataattgac aaaacttgta ggccaccaag atgtccttca gtgagcgaat 170010947
ggttaaataa atgatggtgc atcctggcag tagaatatta ctcaagacta 170010997
aaaagaaatg agctatcaag ccagtagaag gcatggagga accgtaagtg 170011047
cacattacta agtgaaaaaa gccaatcatg cttccaacca tgtaacatta 170011097
tggaaaaaag caaaactatg gggacagtaa aaagatggct ggtttccagg 170011147
gttgtgggga ggaagggatg attaggtgga gcacaaagga tttttagggc 170011197
attgaaacag ttctgtatgc tactacaatg gtagacatat gtcgtaattc 170011247
atttgtcaaa acacagagaa tgtaccagga gtgaacccta atgtaaacta 170011297
tggactctgg gtgatagtga tgtgtcattg tagattcctc agttattaca 170011347
aatgcatcat cctggtgtgg gatgttgatg gtgggggaag ctgtgcatgt 170011397
gcgggagtag ggagtatatg ggaactcttc tacttcccac ttaattttgc 170011447
agtgagccta aaactactct aaaaaataaa gtttattaat caacaaagaa 170011497
cacagtgagc tgcaacttca taaccagtag attgacaaga attaagaaat 170011547
ttaataaaga attgattaga atatggagca acaggaactc ttacacatta 170011597
ctgatggaaa agaaaattgg tatacctact ttgtaaatag tttggaaatg 170011647
cctagaaaag ttgaatatga ccccaaaatg acctaataat gccactatta 170011697
agtattgacc ctaaaaaatt attgttgaac gcatttttta agagataaat 170011747
gcaaaaacat ttgttgcagt atcatttcaa cagcaaaaac tggaatcaat 170011797
ttaaacagct ctcagtggtt gaatgaataa actcatttta tgcaaatga 170011847
aaataaaaat agatatggga acaagattta ctatcaagtg gttttctcaa 170011897
ctttcctctc ttcttaagaa tattttattt tgcctgccat caaaactttt 170011947
gttccagggc atccatggtc cattgtttag tttctgcact gaacaaaggc 170011997
tcttgatgaa ggagtgagtg ggagctgaaa tccagccatg ctctgctccc 170012047
caagccatgc atttgggtgc aggctctgtc tctacccaga gagaggaggc 170012097
atcttttact tcagatattg atgtcatcta ttccccaaat ccagtgctta 170012147
caagtctgga tctgccctgt gggaagtatt tttcaaattc atctactcag 170012197
cctgagcatc attttctaac tcacacaaag gcattttttta gattagtagg 170012247
agcactgacc tgttcaccac ccagcctatc catcctggta caatcctgtt 170012297
gtaaccaagc aggtacccag gcctttttaa tgcagcagag aaataggaag 170012347
tgaggcagga gggaggcaag gtgatgtctt gtcttttctt tgtcatgaaa 170012397
aggtcaggaa agggacagat agagtgaaag aagattggaa aataagccag 170012447
agaggctcgg ttgttcttca taacaaaaag aagttggggg taagtaagag 170012497

FIG. 1.114

```
aaagagccag gaaagagagc cagaaaagtc ccaaaggagg ggtgccctgg  170012547
ggagccctct tgtgctttat agcatgagtg gctcctgtgc agttgggaga  170012597
aggaagaaca tcagagggga gagaaaggg aattttaaga aatattgcta  170012647
agcgttatag attagatacc ctttaatgta aatattcaaa ttccttttta  170012697
taaaaaaaga tatattgaaa tataattgaa atacaaaaaa attgtacata  170012747
ttaaacatat ctgattttat tagtctggac atatagccag acctatgaaa  170012797
tcaccacaat caagatatga atataactat caccccccaa agtttcttca  170012847
tgtccttttt aatcccacct tccatccctc ccaccctgcc atcccccacc  170012897
tcaggtaaca ctgatctgct tcccgtcagt agagagtagt ttgcattttc  170012947
tacagtttta tctaaatcag ccacgcagta tgcattcttg tctggcttct  170012997
tttattctgc attattctgg gactcattca cgttgtgtaa ctgaatactt  170013047
cattcctttt tattgctaag tagtattgta gtatttcttt gtatggatat  170013097
accacagtag gcttattcat tcatctattt atagacaatt ccaacttttg  170013147
actattacaa ataaagctac tatgccattc acatacaaat ctttacgtgg  170013197
aaatgctttc attcctcttg ggcaaatacc taggggtgga attgctggat  170013247
cacatgatgg atgaaacctt aactttttaa gaaattgcga atttaggatt  170013297
ttccaaagta gatgtagcat tttataccca ccagctctcc attaataaat  170013347
tggatttcat caaaaattta aacttctgct ccaaaagaca ctcttaacaa  170013397
agggaaaaag caagccacaa tatgagagga aatatttgca aagcatctga  170013447
taaaacatgt ggatctaaaa tatgcaagga gaataacaac tctattttcc  170013497
actaaggaat gaatgactgt acaaggacca cattctaatt aggagcttct  170013547
gaacccaaag gaatttcaga taaggggaaa tttaggccca aagccaggag  170013597
aaggggtgag tagggcttga tctctgcctc tgaagggcag agggcgtgga  170013647
ctattcttgg ctcttagggg acagctagag aaatgtgggt ctcatggcga  170013697
caactctgga ctccattgga agaaccttct aacagtcagg gctcccagag  170013747
ataaactaga caagtcacca agagaggcag tgggtacccc tcacaggagg  170013797
ggtgcaaatc aaagccaagg cttggagtgg accatattaa atccatttct  170013847
tatcctgtga ttcttagagt cctatctgta tcaggggaag gcaggtgggt  170013897
tctagaactt tctaaatgtg tccctgtggg tttttccttc tccagctaca  170013947
cacaaacttg ggcctaataa gaagtctatg gcattaaccc agcaggaatg  170013997
cttaatgctt atatctgacc tcaaaccaag actgtctcca cagtgaacaa  170014047
ccccgtcctg tcccctgggc gtctccttag caaatgccat cagtcaatgg  170014097
tgcagccatc ttggagccct tgccatctat aatcttctac cgccaccccc  170014147
ccagctgatt gttttctttg tatgtctcct tcctggacat tacttattct  170014197
ttacttttaa atatttgctt ccgtaaaaaa acaaatgaat gcctcggaca  170014247
gatttataaa gaacattcct ggagaggcgg gtggattaat tattcagcat  170014297
cctctccctt tgtaactatt tattgtctca tatgcattta tatggtacct  170014347
atcactgcag atctcgctcc atgctggaga cataatttcc agtgactgac  170014397
tacttgtcta agatatatat cgtattgcaa tactatttta tttctgactg  170014447
taagggcacg tgccactgtt gggtaattgt gttcatgttt ttaaatgtga  170014497
aaaataatca aatataactt gaaagagatt gtacagtaat tcaaggggat  170014547
attaaaccac caggaagtta ctcggcaaat aaataggcgt ttgtggctgt  170014597
cacgctgagc aatgaggagc tggctggctg tgggggaggg ggagacagag  170014647
agaggaagac aaagaggaga gtgcagtgtg agtgcctggt tgccaggtta  170014697
gttgtgttgg gggaaaggag cttctaatgg ccaagaatag aagacctgaa  170014747
gttggctagt gcgtggctag tgcctgtaat cccagcactg tgggaggcca  170014797
aggtggatga ttcgcttgag cccaggagtt caagactagc ctgggcaaca  170014847
tggaaaaacc ccgtctctac taaaaataca aaaagttagc caagtgtgat  170014897
gacacatgct tatagtttca gctactcggg aggctgaggt gggaggatag  170014947
cttgagccca ggaggcagag gttgcagtga gcccagattg aaccactgca  170014997
ctccagcctg ggcaacagat tgagacccta ttaaaaaaaa aaaaaaaaaa  170015047
ggaaggaagg aaggaaggag aaaagaaaaa agaaaagaaa agaaaagaaa  170015097
```

FIG. 1.115

agaaaaatga cctgaagtca ctggatttcc ttcgaggtag ccagaaacag 170015147
aggaaagggg gcattgccca cttagggtaa aaagtagagc accgaattgt 170015197
ggaaggctgc aggttttcat gtgtgcttgc ccaagtgatg ttccatgtca 170015247
ggctctaggg tccctgcagg gacagagagg gactaacatt tacttacatg 170015297
cctatagtat gtcaggcata tacttgtgcc tttatatata tcagctctgt 170015347
ttttgtcatt aaaacatccc tgtagaaaga taggcactgc tgtcccattt 170015397
tacagatggg gaaacccaag ctctgagtgg ttcagcaaac cctgggtgca 170015447
taccccccacc ttgcccctgc aaaaccaaca aaaaaacgaa ggccctgcct 170015497
tcctggagct gacatttagg ttgattctga aagtcagtag gcccagattt 170015547
tcactcttca tttttcttgt ttggaatgag agagcacaca gctgggtcgg 170015597
gggaaggagc gagggtctag gcctgcatcc actcacccca aaggaaagga 170015647
gtaggggacc agtctgctgg acatgcagac agcgattgga gaaaagtcag 170015697
cccagctatg aaccccattc ctttcagtat gagccaagag ggatggcatc 170015747
tgtcagagtt gctggatttg ggattttgca tcttgccaag tgtccatgag 170015797
gaattgggga aactctcccc ctggctggac tgaggcttca gcaagcattg 170015847
ttgctgccca gtggtgatca gctcagtgtc cttggaaaag agcagaaagt 170015897
ggtatcacga acatatcttc tcctttgctt ccttctcctc actcttcatc 170015947
atcatcatca tcatcatcat caaatatgga tctgtgaggc tacctctggg 170015997
gttgaaactt ggttttgggc aaaatttgtg atgttctctc tgcccaatcc 170016047
agcctcaggc tacaaatgaa tgtaaaaatc tctaatttag tgccaagtaa 170016097
cagaaaacag ctctacttat cttaagccaa aaagagggac ttctcagagg 170016147
catactaatg gaggatggca agagggcctc acgtggaacc agggcctgga 170016197
gcggcacagc attcaggaag ctcagtctcc ttctctctct ctctctcatc 170016247
tctgcttgtt tccctttacc tgtagacatg ctatcatttt tccaatatcc 170016297
atggcagaat gtggccacca gtaactccag gtgtataaca gaagcctggc 170016347
ctcccaggag agggtgactt gatgccctta gctccagcct tccactccca 170016397
ccctgggcca agcaactggt ggccaggagg agctcatatt gcaggaatat 170016447
tgaaattttc actaaaatca tttgaatcga ggaggacatt tcctagaaaa 170016497
aagggtgcta gtctgacaag cccacagtgg tccccttcat ctggcaattc 170016547
atcttctgca aaggtcacac catccttttc gctttccaac ctctgcacca 170016597
gtgcccaagt ctgtcactcc ctcctctcat tctgaaacat cctctgcact 170016647
ccattcacca gtgccaagcc ttgcccttct tcagggttca actttgtccc 170016697
accttctctg agaaggctgc cctggtccct gcaaccgcta tgagctgcct 170016747
tttctgagct cttctgctgt ggaggatcca tgccattgac ctaggcaccc 170016797
gttttccaca tattgagcat tgctgagcac ctattctgtg ccaggcactg 170016847
tgcttcaggg ccatggggga tgctccaagc ggtaaaatgc aaccaaagcc 170016897
ccgaaggagc tcacattcta gtcatgtcca caaagaggta ataaatccat 170016947
aaattgtatg tactattcta gtcacaataa aattgtgtcg tactgtaatg 170016997
ctgggtatcc attttaaaac ggggggcatc ggctgaatct gggtcattac 170017047
agtaggaaat gcatatatat aatcatttac tcatgaatat taatgtattt 170017097
aatgagggta aaagatatta cttaaagcaa agtattcgtt ccagctactg 170017147
ttggatttgt tcattactgt ttcccatgca gatattacct gtgatttacc 170017197
tgcatatcaa gcatctggaa gtagctcaaa tccacctgtg ggtaaattag 170017247
gttagccatt tgttggcaaa aattacagtg ttaactaatt tccagggtat 170017297
gcttgcagtc agtagtttca tacttaggta catgacttgc attcacatca 170017347
tctggttaat ggtgtgaaca gagattttct ttatggtttt tggaatacag 170017397
taagataatg ttaagctaac gtaagtctgt taacagtacc tggttctgaa 170017447
ctgtatttat aaggtgtatc ataaaaccat tactttggag tttgccaatc 170017497
ttaaattcag aacaattcaa aaatgagcca gaatctagtt tgcatcatta 170017547
ccacttataa aaataaggat ctgtaagttg gctggataaa atatattaca 170017597
aaataatgac ttaagtggct ctggagccag cacaaaagat aaaaattggg 170017647
tatactcaaa attaccttca aaatatctta agtcattctt aaaatacatg 170017697

FIG. 1.116

taaatatgcc aactcaaaat acatccaaca aaactaatat ttttcccaat 170017747
ttgttggaag aaatttctct ttctttagtt gtgcattaga tgaggaagtc 170017797
agagtgcatt aatattcggg gccctgttgt ataaaaatga cagattttca 170017847
atgtatgcta atatgcaggt cacactcggc ccagtgagat gcttgcctag 170017897
aggaggcacg tggaagccaa ggccaaggaa ggcataattc actctggaga 170017947
acttctttag ctggcaaagc tcagtttctc cccggatccc attttgctct 170017997
ggttgaattc gcatgcacca aaccaagacc aaagagttta tgatgtggtt 170018047
cccgccaccg ttggccaata gcaatttcta ggcccacctt caccaaggca 170018097
ggtcctagat gtgttgctag gcatttggag tttactgaga tctgcaaagc 170018147
tgacttcttc cccagtttca ggtggttcag gctgttcttg cctctccttg 170018197
gtgtgtcaga gtagaggaga aatgactttc agtgctggga ccataaccct 170018247
gtttccactc cacttctgac ttgcactgtg ggctgagaat tgacattctg 170018297
cttggggaaa ttttgttccc ccaaccgtag caaagtttaa ttaccatgtt 170018347
cccgctgtgg ggggaaatcc tattcaagaa accagcctct ctcaaatcaa 170018397
tcagtcatct tgctcattga ccaatggttc ggccacccgg caagaaatta 170018447
gaaaaatcta tgcataggag aaagctttcc aacagccctg gaaaggcctt 170018497
gggccccaaa gggctagtat gaggttgagg tgggggagag caagagagga 170018547
caaaacaggc tgggtactga ccttcctcgt actccatggc tcagaactct 170018597
gacctcttgc caacctgcct tccgcaagca gcgagagtag cacggctctg 170018647
aggggcatgg ccagggagga tgtgacctct aagtgctcca agtcactggg 170018697
aaccctgttc taataatagg caaagcttca gttgatggag tgcctatatg 170018747
ggcccagccc tgtgaacagc ttcctctcag ttttcccaga atgaagctca 170018797
gtgcacacac taagtgtgca agaaacacac aagaattaat tgcaatttta 170018847
agtccttgtg acaatcccag gcctgcatct gcagggagtt ttatgaaggc 170018897
tgtttataga attgcgggag gggttaagag aaagacaaga gagtgtgaaa 170018947
tgccccagaa ctagtagcag gaagctacta ccatccctga gcctgaagga 170018997
cagaacccag agagacagac ctgtgctgta ggtcagggcc ccccagtgtg 170019047
agcctcagct gccgctgcca gtccccaact caacaggaga gagctggaca 170019097
ataaagaccc tgtgagcacc cacaacttcc cattggctgc atcctgttag 170019147
aatctagagg tcatgggagc ctgggagagg ccacccatga agatcagctt 170019197
ccaggggcag agagcagagt ggacatggag gggcaaatgg ggaccgtcca 170019247
gcacagtcac catctcatag acattttcct ccacctccta cctcgagtag 170019297
ccagtagggt tccagccgga ctgtggagca tcatcccaac aactgcatgg 170019347
ctgcttccca ctgtcccttt aacagcgcac atgggaggga gccacaggtc 170019397
agcaaggccc ttggctcccg ctgtggccct cacccatgcc catccccacc 170019447
cgtccccatg ctcagcacat cagcttcact ctggctgacc atgtgcacag 170019497
acatgactca gtaagtctgt cttttctttt cttttttctt tctttctttt 170019547
tttttttttt tttgagactg agcctcactc tgttgcccag gctggagtgc 170019597
agtggcatga tctcagctca ctgcaacctc cacctcccgg gttcaagcaa 170019647
ttctcctgcc tcagcctcct gagtagctgg aactacaggc atgagccacc 170019697
atgcctggct aatttttgta tttttagtag agatggggtt tcaccatgtt 170019747
ggccacgctg gtcttgaact cctgacctca ggtgatctga gcacctcgat 170019797
ctcccaaagt cctgggatta caggtgtgag tcaccatgcc cagccaactc 170019847
agtaagtctt ttgaatgtga gcggaggccc ccactcagca tttccaagac 170019897
ctgggaaatg agggtgagga gggggccaag agctctgatt tcaagtccca 170019947
gccctgccac ccattcctta gggcaggcac ccaccaccgc cttggctcag 170019997
gcctcagttt ccatctggaa ggtgctggct gccttgatgg gcctctatgg 170020047
gccctccagc tctgtggctc catgtcaaat gcccctgacc acccttgaga 170020097
ttaacccttt cccaaggata gacagcttcc cccatcattc tagatccctc 170020147
acacttcccc agctcctacg gaaataacct atcccatccc ctaagatctg 170020197
caactgttga gggtaagttt ttggttaaaa agagtgagac agactttggc 170020247
gctagtgcaa aacaagctgc tgctgtaaga gtgcatgtgt gtacctgcag 170020297

FIG. 1.117

```
actggtgcaa tcagatgacc ttcccaccag gctgcacagc actggatgtc 170020347
ctcacagtca ctcagccact cagcaaactt tgactgcaca gcaacccatg 170020397
ccagacctgc tgctggactc caggcatgtt gagaaatgaa tataataccc 170020447
aggctatggc ctcaaaacct tcaaaaccca gggcaggaca cagacaggga 170020497
cacagatgtg atacctgctg ggatacagtc ctcatgaggc tctctaagag 170020547
gtatctaagc agggacctag agggaggagg tattacctga gttgaaccta 170020597
atggaaaggc attgcaggca gagggatcag tataagcaaa tactcagacc 170020647
aaaaacaatg gcatggggga ctccaccaaa gaagtaaaag agaatagggt 170020697
gctacatggt gtctcagtcc cttttctgtt gcttagaaca ctgaaactag 170020747
gcaatttata aagaaaagga atttatttct tatggttatg gaggcttgga 170020797
agtcccaggt tgagggagca catctggtga gcccttcttg ctgggggcag 170020847
gtactccctg catagtccca aagcagcata aggcatcata tggtgagggg 170020897
gctgagtgca ctagctcagg tttctcctaa aaacccacca gtcccactcc 170020947
ccaaataatc cattaattca ttcacccaca aatttattaa cctcttaaag 170020997
gtcctacctc gcaatactgc cacattggag attgagtttc aacatgagtt 170021047
tttgagggga aaagtattca aactatagct cacagagatc gcttttccta 170021097
gagatggcag atgaattttg gaggtagagg gagaggggca gatcacacag 170021147
atctcatagt gtgtacaaac ctgcccttcc tgccggtggt gggcagctga 170021197
ggaagggtct gtctcatgaa ccattaaggc tgcagagtct agcacagcat 170021247
ccaggccaca gcaaaagcat gagacatact tggtgagtga gcaagagaat 170021297
ggaagaagaa atcaatggag ccaaatgact ccaccagatt tgcatttgag 170021347
acggtcactg caagactgca ccagtcccaa attcccaaga cagcaatgtt 170021397
ttccacgatg ggtctgaaca tgtaaccatt ctcaggttcc tgttggggggt 170021447
ttgggagcct agaaactgag acagcctcac agctgacaga tcacgagcag 170021497
ccatctaagt cgacgtttcc aaagtcatgg ggcctatggt ttgtgagctt 170021547
atttaggttg tccccgggcc cagcatcaaa agcattgaga cacgtactga 170021597
gggactcttt tcctagcctc tcagtcctga ctgctcaagg accaagtggt 170021647
acttcttgcc tgcgttcctt taatgcttgc ctaatatgag ctagtcttct 170021697
ctgatcactt tttttttaa tccaaagtag gtgggcattg tcccaagagc 170021747
ctttggaaag cagctgcctc tcactaggac ttcacagcat cattttgctt 170021797
tgctctcttt gtggttaaaa ttaccttcca ttcgtggtgg gtgtatgtca 170021847
ggatccccac aagaaacaga gggacaccca aattagggac atacttcaga 170021897
gggactaatg acaaaggcat gggtgggagt agaggggaat acaagggaga 170021947
cttcaagaat cttggccttt attataaatg caatgtatgt ccactatgga 170021997
aaatttgggg aaaaaagcaa actagaaaga agaaaaacca cattgcctga 170022047
attcctactg catggagaga agcatcataa acacctttttg gaggagtctc 170022097
ttcttccttt ctccctttct ccttctttgt atagagaggt ctttcctgag 170022147
gacttcccag aatcttgcag atccaaaatc ttaagaattt gcagaggcag 170022197
tgaggagtta acatgcacag ctcagggaat attctgcttt ttatctggaa 170022247
ccaggctcgg aacaagactc cttgcttttc tgtcctgtgt tttcatcttc 170022297
tctcagaacc ctaactttga gataagatct ttgactatta ttaggcgggt 170022347
gcaaaagtaa ttgtagtttt tggcattatt tttaatagaa ctgcttctgt 170022397
gtcctcagat ctccatcgtt catctcctga taagtccctg aaaatttcct 170022447
ggccccttgg agctccttcc aggagtagaa tgatcacaag agctgccatg 170022497
tattgcttat tctggcctat ttccttaggc acattagccc atctaaccgt 170022547
ttccatggcc cacagaggtg ggaggagcat gaagaaaaat gcaaggaaat 170022597
aagctcatct caaggtatct ctggctccca aagaacatag gacattacca 170022647
acttgaagtt agcttctcag gaaactaaga cccagctgct tttcaaatcc 170022697
tcaaaatatt agtatgaatt atagatatag ttatagcctt cagaacttct 170022747
ggcacagccc aaaactgttg gctgtaaaac catgtttcct aaattcaatc 170022797
atgtttctca ttgatttcca ttttgaaatt ggaagtcttt gccctcaaga 170022847
tataataaaa accataccaa agaaaatgga aaacttttcc cccttaatat 170022897
```

FIG. 1.118

```
ttaaaggaga atgattttta taaaaaaaaa aaaaaacatt catttgtcta 170022947
cttaaagtaa atcacagtgc agtgccagtc tgggtttgga gcataacact 170022997
tttttgatt tatggtttct gccaggagac acccagctaa tgatatttgt 170023047
tcctatgtcc ttctctgact agctgggtgg cagctaaaga gctagggtga 170023097
ggggagacca gaactccagg cctgtcccat gttcctgtct cacccatatg 170023147
tggatttcaa ccctgggctt agtgtctgcc tctagcgaca tgggaagaga 170023197
gggatgggtc ctctccttct tcttgtcaaa tggcccccag agtcccacca 170023247
aggtggagct ccaggctcct gaccagcggg gctccccaac cctcctgctg 170023297
tgcccagtct atccctcctt ccacgcccag cagagctcag cagacttgcc 170023347
cttggccact cttgtgcctt cactgctgtg tgtcctggac aggagccagc 170023397
gtgggcttgc tgatcacaga gaaagctcac gtggcaaaag aaccagtgag 170023447
attaacaagt cgaggtttgg gatatatctt agagatggag ccaatggggc 170023497
ctgcagagga tttccctggg gactggaagg gtgaggaagg agaatgctct 170023547
cagatgacac ctaggtggct gatgtgatag aatgggcatt ttctggaaga 170023597
tctgttcagg ggcatttggt gagacagaaa tcaagggttt ggcttgggac 170023647
ctgatatgtt tgatcaccct gtcagccacc caggtggaga ggttgaggag 170023697
atggctgatg gcatgggtct ggagctcaaa ggagaggctg ggtgaggctt 170023747
gagttacaca tttgagggca tccatgatgt gaagcacatg gggggcccca 170023797
cacaggggtc tgtgtgttcc cctgtggtgt gtgtggggac acgtgagtat 170023847
gtgtttctgc gtgtacattg acatgcatga ctcagaatgt cacatccatc 170023897
acaatttcct gtctgacctt ggctgaggta tgtctgagtt ttaatggcct 170023947
gtaaaatgag gggtgatat tagatggcat ctgagaccct tgccaactcc 170023997
acaattctag gagttgggga atcccaaaga tgctgccatc cctggtttgt 170024047
ttgggtgaac aggaacagag aagtcttaag accacaagca gtgaggttag 170024097
atgcgagttc tgcacctccc ctggggcctt cagcagctgc attcttggcc 170024147
cagcagagga cttgcctgat ctccaggata gcaaaggagc tgaggccaaa 170024197
aagacacatg ggctactgct cacccagccc catattatac ccttttcatc 170024247
gctgcaattc aacataaaat catatcattc acacctaccc actcatgcat 170024297
tcattcagca catgctcatt tttgaaccgg caaatatata ttagatatcg 170024347
atgctgtgct gaatgccaca gattgcaaca ggaatcagac gccaacctgt 170024397
cccggaggag ctcacacatc tttccaaaac caatttctac ttcttgggtc 170024447
ccctctcaat gtgtacaaca tagagctttc cttgcaaggc tcgagcacaa 170024497
cgcagcagtc actccttgtc tccaggcctg gctgtagaca caatggaggc 170024547
tcctccttgc catctgcact ccagtcaggg gaggacacca atccactacc 170024597
aaatgaccat agccagcatt tactgaatgt agacacactg taggtagcag 170024647
atttcaggca cccaatccag gtattgcagg aaggtagctt ctatttttct 170024697
ataactgaac ttgacttctt tcttgggtcc tcattctgct gggcatggat 170024747
attttagttt tagtttattt ggggtaagct cagccagtgc aaagagtttg 170024797
cagtctaggt agggtgttct ttcccttctc ttcccactag agaatttata 170024847
aggtgccctg gcactgttga gggaggagct acccggggga ggaatgaccc 170024897
tccgtcactg aaggctgtgc tggaatcaca tttcctctgt ctccagccct 170024947
gagtccacca aagcatccat ttcttccagg tttaaccaca aggcctttcc 170024997
aagactgccc aggtctccgc tcatccttct ccaggagatg ctaatctctc 170025047
ggagaatctc ctctccaatc tgaggactgg ggcctttcct gccttcctgc 170025097
caccaaacag gcctggagtg gaggagagcc agaagccttg ccacctcccc 170025147
aggctacatc caggaagagg caccaagccc acttgtcctg aatctcaaag 170025197
cctacttaag agcttaggtt ctgttgtcac aagatcatgg gcacaagccc 170025247
tcgcctggtt ctagagagag tggggtcaga aacactctca gcatttgagt 170025297
ctctttctcc tcctctgtct atcctccttt ccctctggcc cagagaatct 170025347
tcctccactc cctggagaaa aacctatccc acacaccctc acatattctt 170025397
caagatctat tggttaaggc atccaactta ttgcttaagc atttcaagga 170025447
ctggactttg gaaagccaag aatctgagtt gcaaagtctt ccttaaaact 170025497
```

FIG. 1.119

```
caaaaactgg gctcataggt gctcttctct ttttcttggc atttgcctaa  170025547
aagccacccct gaggacacct aggagaggcc acctcaccac ttcttgaacc  170025597
aggcatgggg gatggggaag aagacactgg ggaaaagctc tgagtggtac  170025647
ttcagatcat cctgcctcag gtgttggttc tgatcctctc aacgactccc  170025697
aagggaatat gtcagctcca ttttgcagac tgaaacccga gtctcggaat  170025747
gacttgtcca tggtcacaca gttgctaaac atctgagcca gagtgaaact  170025797
ctggggtatt tgactttaaa gtcccagcct ttaaatcatc ccacacttgc  170025847
ttattccaac ttggacttgc cggagtccca tagacagagg ctactctccc  170025897
accgtgctga agctggtgca tgccatgttt cagtaagaga aaggagggtg  170025947
cctgggcttc gtctccaccc aggtgcctct cccccagcag ctgcaccagg  170025997
ccagctgagg gggattttag cccgaatcca gggtttctcc tacagaagac  170026047
aaggagtttg ggcactgcca gaattagaag aacagaaaga aaatgttctg  170026097
gatttctcat caaatgcccc tagcctgaga aatataacta aattcaccct  170026147
taggtcatct tacaatctgt cctgccccag tgttccccac tcagggaact  170026197
gctccaccca catcctggtc cccaaaccag aggcctggga gtcacccttg  170026247
acatttcctc ccctacaccc ctaatcaatc aaatcctgtt tatcctgccc  170026297
tctgagagtc tgcaccgaaa tctctctcct ctccttccca cctaccatgg  170026347
cccagcagct ttaccatcat gtctcacgga tctctgcacc gctcccaact  170026397
ggcctgtgcg ttcactcctg ccccctcctc cagccctgtg tacactccct  170026447
tccaccatcc tttctatact ctcctcaatc ctatctgcac cctccttcaa  170026497
ccctgtctgt actctcctcc aatcctgtcc acacactcca aacaaagtca  170026547
tatttccaag acaaatttga ccatgccact ttctcccaca gctctccacc  170026597
acctccagga tcccatcctc agtgttagcc agacactccc aaggccttgt  170026647
gatctgccct gcctatgtct ccagcctcat cctgcaactc cccctacact  170026697
ctgtgttctg gccatcaaac caatgggctc ctcttcctgc acccccatcc  170026747
actcttgcac atcctgcact ctatgtctga acagctcggt ttctcttctt  170026797
ttcttctggc acatgtctgc tctacctgca ggtcatctta gatgtcactt  170026847
ctcctaggaa ggctttccta acctccaaaa caggctcagt tcccctcttc  170026897
aattctcact gagcctcctc cctagcattt ccctctctgc attataattc  170026947
ctccctgtgc aagtgctcat ctccccactg cactataaga tctaggaggg  170026997
tagagtctgg gtcccattcg tttctgtacc ctcagtattt agtagagatg  170027047
gggtttcacc atgttgccca ggctggtctc gaactccaga gctcaggcaa  170027097
tccacccgct tcagcctttc aaagtgctag gattacaggc atgagccacc  170027147
actcccggcc ctctgcattc ttctatttaa aactatttat tgagatctac  170027197
tattggctag atttcgggga tgaaaaaggc agacaaggcg ccctgccctc  170027247
aaggggtttt cagtttagtg gggagcaaag caaaaagaca aacaaacagt  170027297
taaatataac atctagtagt gataaatact ccaaagaaaa ctaaagcagg  170027347
ggccagagag catgggggca ttgatgtttt agacaaggtg gtaaagggag  170027397
gtctctctac agaggtggta tttcagcagc agcccgagca ctcagtaggt  170027447
ccatggtaaa atttagttga ctcccgaact aactgagtgt ctcactcagt  170027497
gaaagcctct aatccatttt gctagaagtc tttccctgta gctcatttg  170027547
ttccaagtca caagcatcag gcttggaaga cctgtgtggg agagtaatta  170027597
acctaataca cagcgcgggg aatggaagcc cgaaccccca gaagcctttt  170027647
ctgcaaaagg accagggctt gggtaataaa atggggcttt cattctcatt  170027697
aatggggcaa ttgatttaaa gaacagaccc agtggcttat tgatcagtgt  170027747
taatcattag aaaatgctga cttaatgaat ctaactgcca tgaggcccct  170027797
gtgggatttg ggaaggccag ttagatacaa taactttgtc cccttccagt  170027847
ccagcagaca gatttattta cagaaatctg gattttttt ttctggaaaa  170027897
aaagtcaaag agtcactggg ggttaagcca tttctccagc tgatctgaga  170027947
gatcatccca agcctttgta atacgcctgt ctctcctgcc atgctctgtt  170027997
cctatctagc ttttcaaaac aaactcttca ttttagaata gttttaaatt  170028047
atagttagag aaaaacttca aagatagtaa gagagttccc atatcctgca  170028097
```

FIG. 1.120

cacctggtga gccccattgg taacagctta ggttaacact gtcaccacta 170028147
atggacaaat gttgcaatat tattatttgc tcaagtccat acttaactca 170028197
gacttcctta gtttttacct gaagtccttt ttctagttca ggatcccaca 170028247
ttccatttcg taggcatgtc tccttagact cttcttggct gtgacagttt 170028297
cttaggcttc cctctgtttt gataaccttg acaatattaa ggagatattg 170028347
ggcagatgac tgtagaatgt ccctcaactg ggtcttatct gaagtttttc 170028397
tgatgattgc actggggttt ggggaggaag agcacagagg taaagtacca 170028447
ttcacatcac atcatttgaa gagtgcatgt tatcaacacg acctatcact 170028497
gctgatggtg acctcgatca cctggctaag attgtgtttg tcaggtttct 170028547
ctgctgtgaa gtcattttcc tccctcccct cttacacact gggctctttg 170028597
gaaggaagtc actgtgtgca actcacactg aaggagtggg aagttagaga 170028647
tcctccttga gcgtgggcca tcttcatgaa ttattgggaa ttattctgca 170028697
taagagattt gtttatatta atatgagctc atggatattt atgttgacac 170028747
tttgggttat aatccaatag tattttactt cttttcttgc tcaaattact 170028797
ccacctttgg gtactggggc tcttgcagtt ggctcctatg tccccgtcat 170028847
tgaggggttt gggttttgtg tgtgtttgcg tgtgtgtgtg tttgagcact 170028897
tctttactgt tggcaccaaa agatgcttag gcttgctttg agcatctcct 170028947
gccctggccc tggagccact ccaaggaacc tccaagaacg cctgattcct 170028997
tttattactg gctcctatta taattttcat aatgggctgt cattttgttt 170029047
tgtctggttt tgtttataat tataagggta agtcagctca ttgcataaaa 170029097
tatagcaaag atataaaaga ataagaatga aaataagtat cccaaataat 170029147
ccaagcagca aagaaatcca gcgttaacat tttggggtat tttcatctgg 170029197
tctttttgct agttgctggc tcttaagaag tctgtgcttt cattcttgat 170029247
ctctgccaga ccaaggata tcatgggccc tggtttacct ccctgtccca 170029297
gcatctgtgg ttggagcagc ttccatttgg ccatcctcag gtggtctgct 170029347
cgctgggccc ctgcccactt ctccctccag cagaccgcag gccaagaggc 170029397
caggagccag ggtgtgtcct ccagcagact ctgaggaagt gaatacatca 170029447
ctgttctgtg acttccaacg tgatagttgg cctcattttc ctcttcttta 170029497
cgaagtaaat gcgataatat atacaaagtg ctcagagaaa ggcctggtaa 170029547
gaaacaggta ttttaaaaag taaaaactgt cggctgggcg tggtggctca 170029597
cgcctataat cccaacactt tgagaggccg aggtgggcgg atcacgaggt 170029647
caggagtttg aaaccggcct gaccaatgtt ggagaaaccc cttctctatt 170029697
aaaaatataa aataagctgg gcggggtggc aggcacctgt aatcccagct 170029747
acccgggagg ctgaggcagg agaattgctt gaacctggga ggcagaagtt 170029797
gcagtgagcc aagatcgtgc cattgcactc cagcctgagc aacaagagtg 170029847
aaactccgtc tcaaaaaaaa aaaaaagtaa aaactgtcat tattataacc 170029897
ataattacta ttagcaatct gaagaaacac atatctaatg atagaagttc 170029947
aggcatagtg tggcaggcag gcccctggga gggatgaatt tgcacaagca 170029997
aactgccttc tccatggaga cctaatgaaa ttcatccggt ccttcttgag 170030047
agtttgactg agttgggaac tgtgtctcca ccagaccagc aaatggaaga 170030097
gaagtttcct ggggctctag ctgaagagtg tgtactgagg ggcagtattg 170030147
cattgtggtt gagaacatgg gctctagagc caggctgctc aggttcaatg 170030197
cccagctcca tcacttacct gctgggcagc agcctgagtt atttaaacct 170030247
cactaggcac aatgtaagga taacaatatt gactatccca taaggttgct 170030297
ggggatgcca aataagttca caaatggaag aactttacac agtacctagc 170030347
acagagtaag cagccaatta atattactcg agttactgtt tttattactt 170030397
catcattcgg gactcttccg gttgcaagta caaggaaagc caacccagaa 170030447
tcacttaaac aaaagggaat ttattggctc atgtaactga acttcaacat 170030497
tttacagaat ctcattggct ccaatgggct catacgtcca tccccaaacc 170030547
aatcacagtg actgagggat tatccaagga tcacactggc cactttcaca 170030597
ggttttatcc ctaaggaaa tcacaggtaa tagatgtggg gctgcagaaa 170030647
tgcaacatgc acttttcctt gaaactgcat ccctttccc tgaagatgaa 170030697

FIG. 1.121

```
gcttgaaaga actctaagag gttaagcatg gagctgatgg gcaagccaca  170030747
ggcagaaaga gtagctgtgc agccaggctc ctggccaggg agggcagata  170030797
aggaggggag gcaaagtttg gtaaacagga agctaatcta tgggcaagaa  170030847
tcattttctt cagcatcctg acctctccta aaatgttctc cactggtccc  170030897
tgctaggaca aaggaattac caccagacta gagtcaggag tcctgggctg  170030947
gttctgctgt atgacacagg acaggtggct tgcctggtct gggccacagc  170030997
ctcctcccct gttgatgagc atgttggttg ttccagcacc atgtcagccc  170031047
tagaaatctc tgaattcttg accagatcag taattgctct cttgcgttta  170031097
cttttccttc aaataaagag attggcatac aggggaggag cccagtacag  170031147
acggcatgct tggctcaggt tccagaaccc agaaaccaga caagagttgg  170031197
gaaaccatga tggtggagga gggtgtgcca ctccttacta gtgcctaatc  170031247
tcttcgagac actaatgttt cagtattatc cacagattct gatgccaggc  170031297
agcccagatg actggggtca gttattagca tgcttcctgg aggtggttcc  170031347
caggtgcagg ctacctgcag tctggctgga tgggccctgc accacacttg  170031397
cttctgggaa gctggttttg gggttgccac aatctctgaa agaatcacta  170031447
ggccaccctc tgagtgggtc cttctgtagg aattatggat aaaattgttc  170031497
cactagtctt accttcttgg ggaacccttc ctggattccc aggctgggct  170031547
gggtgtccct gcagcctagc cccacagccc tcctgcttct ctttctcatc  170031597
acagtcttgt tatctctacc aactgtaggc ctgccccact gatggtgtga  170031647
ataaagggac tgggtctctc tagcacctag catagatctg atacatagtg  170031697
ggtgatctct attgaatgaa cgatgaatga atgaatgaat gaatacattt  170031747
agataattca gattactctt tctagctcag cagtgtaaag caggaagaca  170031797
tgctgtcaat atgatttagg gcaagttttc aaatctctct ggacctcagt  170031847
tttacctctt gaaaaataaa tataataatt tgtccttact tcatgagact  170031897
attttgaaga ttaaatgaga taatgtatac actactactc actgtcctta  170031947
cttgaatatt cctaggtcct tggtgctaca ttaggctaca tagaatgtat  170031997
ttaaagtaat agagtggtat ttaataaata ttcattttct ttccccagaa  170032047
ctaccttaaa ttaatttgtt gaaaggacag atggatggat ggttgatgga  170032097
agtagcaggc ttccagcagc aggggatgga gtgagtgtgt ggataccgct  170032147
ggatcagcag aaggttatac cattttagag taactatctc ggacttcgga  170032197
gagttcctgg gtatgaaggt ttggctttaa ttaaagtctc agcacagtgt  170032247
taaatgccat tttattttag gtcataatta acactaatga gatgagtgga  170032297
ttacaaagag cacacatttt gagaaagtga aaaacaacat ctgagcttgg  170032347
tggtttccat tttcgctttt ccccctccca tgctctgttc aattaaaagt  170032397
tttgagaaaa tattacaacc atactccttg tctttgtggt aatgaagcat  170032447
attaatttga atgtgatgaa tacaatattc cactgacttt tttattccct  170032497
tatctacaaa agtttaaaat aatggaccaa ttaaaccagg agagaagaat  170032547
gcagggtttg cctggggatc caattcagca accagagaac tgaaagaaca  170032597
aaatttttttg acggagtctg ggccagactt catcccttac ctatagctga  170032647
caaacagtaa gtcaaattgg gcagatgtgg accagcgcag aacacatact  170032697
atattgagga tcgaaaggcc aggttccaga ccgtcctcta atattttctt  170032747
agtgaatatt tgttggatga atgcatggat gggtggatga atagatggat  170032797
ggatggacag atggacggag agagagatgg atgaatggat tgttggatga  170032847
agttgaaaga tgaaggtaga tgacctccca tggtctgatt cttcctaagg  170032897
tagcaaatta agcctaggat gggctgacct aacccttcca aggacttaga  170032947
agtcagggca agaacttaca gggaagggtt cagttctctg acctcactac  170032997
cctagaggca taaactataa attatagagt tggcctgagc tcagtttccc  170033047
tgggagctct gctctaaagc agagcccctt gaccctgcac caatttggtt  170033097
aacccgagta aggctgagct tcccccagca ggagctcctg ctttggaaga  170033147
gaacatcctg ggccaggcgc agtggctcac gcctgtaatc ccagcacttt  170033197
gggaggctga agcgggtgga ccgcctgagc tcaggagttc aagaccaccc  170033247
tgggcaacat ggtgaaaccc catctctact aaaatacaaa aatttagcca  170033297
```

FIG. 1.122

ggtgtggtga tgcagcacac ctgcagtccc agctactcag gagactgagg 170033347
caggagaatt gcttgagcct gggaggtgga ggttgcagtg agctgagatc 170033397
acaccactgc actccagcct gggcgacaga gtgagactct gtctcaaaaa 170033447
acaaaaaaaa aaataaaaaa aaaagaagag gacatctgga gcaggcctgt 170033497
gaacctgaca catggtccag gtgtctccct gaggacttct ggaagtctcc 170033547
ccacctctct gtggtccttt aggcattaac accaccttgt cactgtgtct 170033597
tctgaggcag tctggaagtt cataccccac aatctctgtg taccttgtcc 170033647
cccattctgt tctctgcatt gcagatggtt taaaacacac acacatacac 170033697
gcgcaaaatg ttgttccttt tcttaaaacc cattgtggcc aggctagaca 170033747
aatccttaac acggtctaca atattctgca tggcatggcc cctgggtgcc 170033797
tcccaacctg atctgtcaca caccacctcc acctttgcct gttccctggg 170033847
ccctagcact aacctttggt tcattcctag acaccttttc agcacttagg 170033897
cccccacagc cctcagaacc tttacacttg ctgtctcttt tgctttaaat 170033947
gttcttgccc cacctaccac ctagttaatg ccttttcctc cttcagctct 170033997
tagttgaagc atcacttcct caaggagggc agccctgatg aaactcatta 170034047
tgcaaactcc agcctgggtt gggccttatc tttatgctgt catggccctg 170034097
agtattcttc ctttatggca ccaatcacgg cttatatgat atacttatgc 170034147
tattatttga gttatgtctg tctcccccag tatgccacta gtattagaat 170034197
cattgatttt taatcattgt atccctagtg cttagcacag agcctggctc 170034247
ataatagatg cttaataaat atttgttgaa taaatgaatg agtgaatgaa 170034297
taaatgcctc attcaagagc tttggctctt tctgtactac tacattactt 170034347
ctatttttta gctcttaatt ctcaaagcac tttctttgtg ctgggcttat 170034397
gctgggagct tagacagtaa agcttagatg gtaaactaca gttgctctca 170034447
agcagttcac aatgtaacaa aaaagagaca caaatacaca gtgacaatac 170034497
agtgtgtcga gtgctacaat agatggaggg gtgcagtttt atggatgtgg 170034547
agaagaaatc cttctattcc tcactggagg cttcactaag gagatattcc 170034597
ctaagctgct tctggaagga aaaggtattg gccaagaaaa taagggtgga 170034647
ggcagaattt caggtgaaag gaccagcata tgcaaaggct cagagggcag 170034697
agcctggcac tggaaacaaa atgcaagtca cttcgtggac tgagacctgg 170034747
atgaggacat ggggctatga gagatgaggc tggggaggga gacaggggcc 170034797
agatcacaga ggcctttcaa tgacagcaac atatggcagc tgcagagaca 170034847
gcatggaagg gactggcatg gtgagacctg tgatatggag aactccctct 170034897
cgaaggggtt cagaaaagag atgtccatat ttcaagtgaa ggacttcctc 170034947
ccctggagaa actgaggctc tgccccaggg ctgtccatca gactccttcc 170034997
cagaatccaa acgcttccaa aggatgttca gtgtggctga ccttgcttat 170035047
tcattgtggg gagaattaat ttcagggtgg agaattttaa aaaaatataa 170035097
gattaagcag tgtaatcagc tgctgctgag agttgcaaat gcaataaata 170035147
ataatagcat tgagagctgt ttttaataac tcaccagtgt aatttagcct 170035197
cggcttctta gagcatattt aaaatatgtc atagtgtgtc taatggcaaa 170035247
tgcctcattg ccagcctctg aagacaaatg tcttcccagg agggaggggg 170035297
gcagaaaata gaggagaaat tggaggattt gattgcaaac agggtgtagg 170035347
aaggcaagca ttgttcattc tgacaccact aattcaaaat ctgtgatctt 170035397
tgcctaggca ataggtttta gttggtttgt cttcaagggt gaaacagatg 170035447
gatagcaata atatggtaaa ggagatattt ataatttgta agagaagagg 170035497
ttgttttcag aatctataga atcaccattt tcatgcagtc catattctaa 170035547
ttacagatca tcctggacta tctattatag caggtcccca ggcaactgat 170035597
atcttgacaa catttgtttt acttagttga gttactaaat attcatgata 170035647
ccatgaaaat gtgttattta aaagtgttcg atgaattctg agttttagta 170035697
attcatatgt gctgtccccg cccaaccccg attagtctaa actggtgaga 170035747
tggggctagg agtcctcccc tcttgggtaa cagacttgac acagttaaag 170035797
tgagacaaac tttggagtca gacagacctg agttcaaatt ctagttctac 170035847
cacttactag ctgtgacctt ttgcagctta aacactgagg ctctattccc 170035897

FIG. 1.123

```
gatctgttaa gtgagagtgg tgatgatgac gaccatgaca gctaatattt 170035947
atggatcgcc tattgtgtta tctccaacac aacgatacag tgacgtaggt 170035997
ctaccatggt tcctgtttca cagatgagga aacttgaagc ttagcgagct 170036047
caagtaactt tcctgaggca cagggctagt gaataaccac tctgggacct 170036097
agtatctgtt ctagctggtt tcaaagccta tgctgttaag tgggctctga 170036147
tactatcttg tacagttggg ggaagatttg agaagacatg tgtaaggtat 170036197
agttcctggt atgtaattag gactttataa atatctctta tatggaagga 170036247
ctgaatgtat cttcctgggc tgtgtcctcg cagggagata taacatctat 170036297
gtcactctca acgctttatt aatgtccctg tcactctata cccttgtcca 170036347
agttactcca caccctccaa agcctcaagt ttttaatctg taaaatggtg 170036397
gtgggcggag gtggggagtg agcgctctta cacatactac taggttgggg 170036447
gtaaattagt aaaacaactt tgggaaacaa tttggcaaga cttagtaaaa 170036497
ggtgcataga tcctgtgaca cagcagtttt attcctggga taaatgctaa 170036547
agcaggttgt ctccatctct gcactactga catcctggga cagatatttc 170036597
attgtgatgg gggctgttct gggcattgta ggggatttag cagcatacct 170036647
ggcaatttat tcccaagagg aaagcaatga ggaaggaagg aaggaaggaa 170036697
ggaaggaagg aaggaaggaa ggaaggaagg aagggaggga gggagggagg 170036747
gagggaggga aggagggaaa tatttaatag ttaagttaca tccacaggtt 170036797
tgattataaa tgtgtgtatt gaattggaat ttctgttgaa attctgatcc 170036847
cttctagaca aagaaggtaa aaattgaaac atgtcaatgg atatctaaat 170036897
atcattactc actggcttta tttgcaaatg gctttccatt gacaacagtt 170036947
acattttgtt caaagcaaca aatgattggc gctgacaatc cacaggaaca 170036997
tggtgcagtc attaatgaat gtgctcatta ttcctccctg ccgggaggca 170037047
tcgactcccg ttctccagcc tgttttaagc agacagacct acatctgcac 170037097
ctgtcagctt ggaaccctag taggggaggg ggatgctgat gtgatggaga 170037147
atgaagaatg ggccctgcag gctgacattt tgggagagta ggttctgaaa 170037197
tttatcccaa aggacatgga atcctggaag cagggttcaa gatcctccca 170037247
aaattgatct cccaggatgc ttggaatgat tgttccgagg gttttgtaaa 170037297
atgccagggg aaaaccagga agcttctctc cagttgtctt gcctccttcc 170037347
tctccagtct ccatggagct gactttgaga attaactcct gagggacaga 170037397
gaccctggga tggagagcca gccctgctgg attccacaag gtgctgctta 170037447
aagcacaaca cctcttccca atgacaggtt ctgaaagaag gccttgtagc 170037497
tagatgcaca gagggttttg ttttgttttt ttttttttaa cctttcagca 170037547
tctgtctaaa attgctctgg gctgggtaca gtggctccca cctgtaatcc 170037597
caacactttg agagctgagg caggaggatc gcttgagccc aggcgttcta 170037647
gaccagcctg ggcaatatag tgagatctct atgtctagaa tgtttttttaa 170037697
ttagctgggc ttgctgcctg cacctgtaat tccagctact tgggaggcta 170037747
aggtgggggg atcactcgag cccagggggc tgaggctgca gtgaaccatg 170037797
attacaccac tgaactccag cctgggcaac agagtgagac cctgtctcaa 170037847
aaaatatata tatataaata aataaataaa aataaatggc caggtgcagt 170037897
agttcatgcc tgtaatcctg gcactttggg aggccaaggc aggcggatca 170037947
cgaggtcagg agatcaagac caccctggcc aacacggtga aaccctgtct 170037997
ctcctaaaaa atacaaaaat attagccggg catggtggca cgcacctgta 170038047
gtcccagcta ctcaggaggc tgaggcaggg gaatcacttg aacccaggag 170038097
gcggaggttg cagtgagccg agattgtgcc actgcactcc agcctggcaa 170038147
cagagcaagc ccccatctct aaaataaaat aaattgctct gtaagttgac 170038197
accactaaaa acatcattag tagttgtaat aattaagata aaggagaaaa 170038247
ctgtgcagag cccagcacag tgcctgctcc atggaaaatc ctaatgacat 170038297
ttagtttccc tctctttgcc cccattttct tatctataaa acagaaataa 170038347
tgctgtatcc taactcaaaa gttgattatg gagagtggca tagtattgtt 170038397
tcaacaaata tttattgaga aactgcaaca cgcaaataga tgtaaaaggt 170038447
tgaacagaac tttgcaaatt aaaaatccta aaggacattt tagaccttat 170038497
```

FIG. 1.124

gaacttccta ataggtaaga ctttttaatc tatctgcagt gtccaacagg 170038547
tgcaagagct tgggcggact gtgaatatct aagaaaagag agagagcaga 170038597
aaggagggag gaagatgaaa gaaggaaggg aggaagatga aagaaggaag 170038647
ggaggaagaa gggagggagg gagcgaggga ggcgggggag ggagagaagg 170038697
gggaggtagg gagggaaaga aggaaggaaa ggaaaggaaa ggaaaggaaa 170038747
ggaaaggaaa ggaaaggaaa ggattacagg tgggagggag ggaggaaggg 170038797
agatatcatt attattgtgc aattgttatc attatataac taatttaaac 170038847
aaacccatcc tgtgcccaca aaagggcacc aagataaagg ctaagataaa 170038897
gaacacacga atcattttcc cattttcgtc agtgatggga atggtaatga 170038947
ttttctctct gaaccataac catcttgcag ttaaataatt gctttctgat 170038997
agaatcagga gctctgagat ggtgctctga ggagttcttt catttctttc 170039047
gcacctttta aagaaaagaa aacttcaagt gcaattattg gcattatttt 170039097
aataccgact gcagcagaac attctggaaa atgaggcccc tatcaaatta 170039147
gtttttccaa atgaggttta gacagtacct taccaggaga accactcaga 170039197
aagcccccat ggcagcagca agccctgttg agtcaagggc acatggatgt 170039247
cacactgcac atgtgttttc agataactaa gtgaactgct ccgatcttgt 170039297
gggtcattgc accacggggc ctctccattt acttcaggtt acacagcaac 170039347
aagcaagctg agagcagcag aagtagctag ctaaaattgc atttgatttt 170039397
gtgactgcta gaggccaata ctcaagtgaa gtttaagcaa aaacaaatca 170039447
tactcagctg aaaacatttg cctggaagaa agatctgtgg ctggagaatt 170039497
ggagttcatg cacccagcaa tttccagagg aagtctgatt cccctacctg 170039547
aagtaacact ccttcctctc cccagatcca gatctccaga ctatacgtac 170039597
tcaatatatg acttgtccat ggggcccagc tgagcattat tgcctctagc 170039647
ttatggttaa taataacagt aataattata ctaatattat tctttctatg 170039697
cataattact aattcatctt aatctcacaa ctctatgaag tacatactgt 170039747
gaatgtctct gttttacagg tgagaaaact taggcacaga gaagttaagt 170039797
aactcatcat agtcacagag ctaagtagga ggcagagtta agagtcaatg 170039847
taggcttctg acccagagat tgtgctctgg acctctgtgc cacactccca 170039897
cttactgggt atcagggact gtgctgagca gtttatggca tcatctcatt 170039947
ttgttattgt aacaacccta tgctatgggt atcagtatta ttcccaggta 170039997
aggaaactgg ctccttttgg agcttgagtg acttatcgtg gtcacacatc 170040047
tagtaagtgg cagagataaa attgaaaccc agagctaaaa ttgtttggca 170040097
aaaacttggc atttgtgatt gtgaccatct tggtttccaa gacgcctggg 170040147
ggactctgca gaccatggcc agtattcatt tgtcaagatg caaggaccta 170040197
aactggaatc cagtctttta tgatgtctgg atcataacaa aagtcaggta 170040247
tctgctccat gaggccagct aatcccccca caaccccaca tccccctgac 170040297
acacatcatc ctcacctaga gaaacctttt cacaaataat caaacctttg 170040347
tttctttaag gcaaatggac ctaaggggaa aaaaaaatgc ctgtcagtat 170040397
tgataaggaa ttgaagagga ccaacaatgt gaagattctt ggccaaaaaa 170040447
ataaaatagt aatttgggac aaatttagta agagaaatat cagaatctat 170040497
gcaggctcac atctccaata caaacatatt caccttacac tctatatgga 170040547
aatagtaaag agcaatttgt gaaatagatt ccatgagtgc cccaattagg 170040597
gcaaacattt ctcatcaaat gaaggatgga acttcaataa agatttcaaa 170040647
gctggttaca tgtagagaga tttgtgaaga aaccttgtag ctctgatgga 170040697
actgggatgt gagaagaagg caggttttct gataaacaat tcctgtatct 170040747
ttcacaaatg ccaaatcaca gactcagctt gggacatatg aggacagcac 170040797
agactttgga ggcaggtaga ttttgggttg tcacgcagac acccactact 170040847
atgagacctg gatttccttc tgacgttatt ggggataaga agtggcacct 170040897
caccatttct aggaaatagt aggtaagtct ttctggttgc cactgaggtg 170040947
actcacctga gacacagttg ctcctaaagt tcaaggttag gagacaatcc 170040997
agaaggggag ctgtctgtga agtcagaatt cttggaagaa tgtaagtctt 170041047
tacacagtaa cagcaaagca gacagtggga accactactc tgccttcttg 170041097

FIG. 1.125

catcattctt tcctagaaat accagaaagc agtgagggat taagtctaat 170041147
tcctggcacc tgaccttata tctaacagat gctcagtatt acctgttgat 170041197
gggacctcac tgggaatgtt ttgtgtgcag tacaaaaggg caatagatga 170041247
aactttggga cgggagccca ggaaaatggc tgagaggaga gcttatgcct 170041297
agcttatgca tgagcttgca aaaagggaga atacacggga gggaagatca 170041347
gcaacagcat gagttttata aggcagagag ttgttgggaa ggaagcagca 170041397
gggagagggg aaggagtaag tagaaaccta gaagagatac agctaagata 170041447
agccaagaga acaaagtatt gacttaccag aaacatggaa gtcttcctgc 170041497
ttctaattta gttccgcata tctggatatg tgaatgccta aaatcccatt 170041547
aagcccagtg ggttaattat tacacttgct agggccccag aggagaggaa 170041597
acacagtaag tcagaaaaac ctctgggcag gtgaatttct caggttttct 170041647
tctgggcaga tgggatctgg aatggtagcg tggcatcctg gtaattcaga 170041697
gacagtgggg agggtgaaga aacactgatg tgtagcattt ctgtggtgtc 170041747
aacaccctac catggctgat ttcaagctga caaaggttta gcaactgcct 170041797
tgctgatttc ctgaaaattt aacaattagt tttcatgaga tgcagtgggc 170041847
tgaccccagg acatcactgc ctacacgcca atgagaatgg agattgacac 170041897
aaagaacaga gtggagagac acagagcagg gaagacaaga ttttcccgag 170041947
tctcaatcca atatgtagac tatgtctccc ttttcacaaa gaaggaaggg 170041997
gaggagagac cagcattcac attcagttat tgttgtttta aatccattac 170042047
gcacatacat aggagaaaat ttcagcaaca gtcaccctct gaacccagtt 170042097
cctcagttct ctccagaggc aactaaaatg ctcaattatt agtgtatcct 170042147
tttggaaata ttttatgtat atgacagtgt gtgtgtgtgt gtgtgtgtgt 170042197
gtgtgtgtgt gttcctttcc aatattaaaa taatattaac attggtaata 170042247
gtggtactaa acaacttagg gtgttttttt tttcatttaa tagtatattt 170042297
ttagtatctt tccaggaaaa gatacatgga tgtgccacat tatttttaat 170042347
ggctcacatg gtactccttt tatgtatgca ctataattta tggaaccagt 170042397
tttctcaccg atgagcatgt aagttctttc agtcttttac tgttataaac 170042447
gaatgatgca atgaatatcc ttgtacatat atatttgtgc gcatatgtag 170042497
gtatccttac aagtggaatt tctgaataaa tggatatata caatttattt 170042547
atgaatttac cttcctacaa gtgattcaag agagtgtctt tgctccacag 170042597
tgttgtcaat atagtgtatt ctcaaaatct gacaccaata tgtgtgaagt 170042647
gcctgctctg ttcccacact ttacacaggt tctcttattt gcgttaagtt 170042697
tatttaagaa gaggaaactg ggcctcatgg agatctagga acttgcccaa 170042747
ggacaggtct ctgtgactct aagagtgcaa tcttcccttt tccccatgtc 170042797
aagcaccttt ccccaccagg ctcactgctg acaatccagt gtacgaagaa 170042847
gggaaattac ccccacagag cccaaaagtt taggacatgc cgacagcatc 170042897
actcttttgc ctcctcattc tctctttcat ttccagaaca tttgctcact 170042947
cagtgctgcc cagtgatact tagccagcct gattacccat ctaataattt 170042997
ctgatactaa tataaaacct tcccaaagac aaatataact gagacgcact 170043047
ccagcttacc atagctttcc tggtggtaca gtttccaggg acatttcact 170043097
gtgtcaaagc agggaccaca tatgttccag accagcttgt tgggtttttc 170043147
actgggaagt gaagacaaat tgttgtccct ttgaaaaagc atctttcatc 170043197
tctccatcta tctgcgatct aaagcaatgg ggctctttct gtatgtcttt 170043247
caaatggtct acactgacac acgttttctc tgagctgccg agagaatatg 170043297
ccatgagatg ttgccagtga tggttacact cagctagcag aagattaggg 170043347
actggttaaa cctttggaga aattgccttg ggaaaagagg aaataaaagc 170043397
aaatattact atgaaacata gagattacca ggtaggagga ggagagaggt 170043447
ggagggaggg gtaggagtgg aaggaaggga gggaggcaga aagaggaagg 170043497
cagactggtg gaaaataaac cgtgcacttt agaacagcag gaagggaggc 170043547
ttggaagcct ggttttctgg ctttgaatga ccgcctagcg cttgccggtg 170043597
cgccagggtg ctgtgaggat gtgggcagag ggcgagtccg aagggctcca 170043647
gacactggga atagtggtgg tcgtgtgctc ctccctgaaa cttttgcact 170043697

FIG. 1.126

acctcggact	gattgacttg	tcagacggta	agcgaaccct	ggagcttccc	170043747
cgttttctgt	gaatgtgttt	ttgtggcttc	ggttgctgtg	acagtcgttt	170043797
cgaaaatgca	cggaaatgag	ggcggagacc	cgagagattt	gaaaaagccg	170043847
ggctgaaaca	gcgtggtatt	ggtccccgcc	tccccagtcg	cgccccagtg	170043897
ctgcgctgtc	cgtcgtgctg	aaatgtggtg	cgcctgggga	gtgcgggagc	170043947
caggaagtta	gggtctcctg	ctccggccct	atgagcatgt	gagtcttgat	170043997
ggattattag	ctatgggtga	ggccagcaca	acacatcaca	attctctctg	170044047
aagctgtctg	gtaactacgt	atattgttga	tggaagccag	tgacttttaa	170044097
aagccattat	gttgattaac	tttttaaag	aagtttagga	gattatatgg	170044147
aggtaaaaac	ctttgtaaaa	tgctaatcac	agtgtctgac	aattagaaca	170044197
catttaataa	atgtcagttt	ctttgctcaa	cccttataag	aacccttatt	170044247
ccaaagccac	ctcctcagct	ctgacttcag	ctccattcct	tagtgagaat	170044297
ggggttataa	atccaggtta	acccgattgt	ttaggattag	aaagtgattt	170044347
ggtttccaac	gttgaaggag	ttcaagaaac	aaagagtttt	atttttcctc	170044397
cttatgagat	attgttccaa	atagaacaca	gtttgtctag	atgattttg	170044447
tcacttaaaa	ttaggctcca	ggaaagattc	caaatttcat	gagcaattgg	170044497
gctcataaaa	caagatcaaa	ctccaatagt	gtatatccaa	agtatgtata	170044547
atgtgtattc	ggtgtatatt	cttccaccac	tgcatggtgt	agacagaatt	170044597
tctcttccaa	ggggcaccac	atgacaaaac	cgtacataat	aatgaaatgc	170044647
atttgtagac	aaaggactag	ctaaaatacc	aactgaaagt	gggaagacca	170044697
gaaactgaag	tgtaagatga	ggtaagccct	ggagtaagag	tcaagaaatc	170044747
cactttctat	ccataatctg	tctcggttta	atgttggtca	agtcattttt	170044797
taaaaaattc	taggtcttgg	tttccttatg	atgactttag	atctctgttc	170044847
cttggaattc	tagagtgatc	caaaggtttc	tttgaattca	gttttgtggg	170044897
ttgagacggg	cagccagact	gtgagtccct	cagctctgct	tcaaccagaa	170044947
cagctccact	ttactgttca	gcatgttagc	cctgtatgta	aggatgtttt	170044997
ttagctttag	ctaaaattta	gtgactctat	gaccctaagg	ccctgcttcc	170045047
ctgagatttt	gaaagctgaa	gcacattcgg	aaaacttttt	cttccttaaa	170045097
aatcacctga	aatctgacaa	tctggaagac	tagttctgtc	tgctccagcc	170045147
cttggtccct	tagatgtgct	tttctgaaga	tccaaactca	acctgccagt	170045197
caatatacca	actgagcaga	gcccctgttc	tccaccagat	ttcaagagaa	170045247
catgttccat	tcctgttcag	agcttcagag	cagcttccgc	taagattgca	170045297
cattaatgca	acagcgtcct	attttctttg	tttctttttt	tttttttttt	170045347
ttttttttg	atgagacagg	gtttcaccat	gttggccagg	ctggtctcaa	170045397
actcctgacc	tcaggtcatc	cacctgcctt	ggcctcccaa	agtgctggga	170045447
ttacaggcgt	gagccaccgc	atctggccaa	gcttcctact	ttcttataag	170045497
gctaaagttg	cagtagaaat	attcccctgc	tcttcctttc	catatcataa	170045547
gtatccatct	tccttcccct	gctttaactt	ctcatgattg	cagtttttgt	170045597
tttattacaa	taaaggatat	caatcattca	tctaatgtta	tagcaatgag	170045647
gggatttaag	gtgaaaggta	gagaacatat	gttgagaact	gtttctggaa	170045697
actctaggtg	aagaaaaaga	agggaattaa	catttattca	acacctacaa	170045747
tgtgccaggt	acagtgctaa	gtgcctttat	atacatgagt	taatataaac	170045797
ctcaaaataa	tgctctaagg	aaaacatttt	aaataatgct	gaagttaaat	170045847
atcatgattc	cttttatata	aggaagaaga	cagatttaga	gaagttaaat	170045897
aaaatttcca	aaaatgcagc	aatagcaagg	tggaggtatt	tgtctctaaa	170045947
atttcaccct	ctgttctgta	caccaagtac	ctcagcaagt	aatccagttc	170045997
cagatgggat	ctgcagtctg	ccattaagtc	tttaccacac	ataggctctt	170046047
atgctagagc	ccttaccata	tggtccaaaa	tgccattttt	aatgtgtatt	170046097
tgatatggag	actctgttca	caatttgagt	actaaagaga	gaataccacc	170046147
tcctagtaga	tacaccagga	ccaatgtaat	gctgtcattc	taaggagagc	170046197
agtggaacat	ctccaaagaa	cccatctgta	gtcttccttc	ggcccttgat	170046247
cttattccta	ttttattttt	aaggtttttt	ttttttcttt	cgagactaaa	170046297

FIG. 1.127

tctcactcta	tcacccaagc	tggagtgcag	tggcatgata	tcagttcatt	170046347
gcaacctctg	cctcccggac	tcaagcgatt	ctcctcactc	agcatcccaa	170046397
gtatctggga	ctacaggcat	acaccactat	gcccagctag	tgtatgtgtg	170046447
tgtgtgtgtg	tgtgtgtgtg	tgtgtgtgtg	tgtgttagta	gagacagggt	170046497
ttcaccatgt	tgcccagggt	ggtcttgaac	tccagagctc	aggcgatcca	170046547
cctgccgagg	cctcccaaag	tgctgggatt	acaggcatga	gccacagcgc	170046597
ctggccaatc	ttttagggat	aattttagaa	cagtatacag	atattgagcc	170046647
aagagtcaaa	agagctgggt	tgcaattctg	gttgtgccat	ttatcagttg	170046697
tgtgaggtgg	gacaagtctc	tttttctccc	tagctttctc	tttcctcatt	170046747
tataaaataa	agaaatgaga	atgatagttg	tattaatttc	tgaggactgc	170046797
cagaacaaat	tactacaaac	tgggtggctt	aaaacaacaa	acatttattc	170046847
tcacatagtt	caggaggcta	gcagtttgaa	atcaagttct	tgacaaactc	170046897
ccctagagtc	taaagtctct	agagaaggat	tcctccttgc	ctcttccagc	170046947
ttttggtagc	tccagtgttc	tttggcttgt	ggcagcatca	ctccaatctc	170046997
agcctctagt	ttgtggtaat	gtattatgac	agtcttagga	aaataataca	170047047
tcagtatttg	gaaatgtttc	ttcatttgcc	acaatatgat	atcaaataaa	170047097
atacatccac	ttaaaagttc	aggtatggat	acacccattg	atttggaatg	170047147
ctagtgaatg	taaaggctta	ggtcaacttc	tctctgcagt	tccaaggagg	170047197
atgagaaata	gcagccttga	cctcccacca	gcgggagttt	ccctccttca	170047247
tccctggtca	ctggccacac	aaggacctgg	catctcccag	taaatgtgtt	170047297
cctctgcaac	ctgagccaca	aacctctctc	tcttttatct	ctttcctctt	170047347
tctaccttca	tatttggttg	gctattttta	gttcttctgc	agatatagtt	170047397
acactttaaa	tgacacacag	cctttaatta	cttacatgtt	gacttgaagc	170047447
aatgtctgtt	gctcaccttc	ttggaaatat	cagaagacaa	gaacactttt	170047497
acttcctcct	ccttctccca	tccttctctc	tgtctactta	atctgtttat	170047547
catattctca	tttttacacc	atcaaggttt	ataatgctcc	cagaacatac	170047597
ctccttcaag	gtaaatggga	atggtaacct	ttggcctctc	cttgcccata	170047647
aggacaaccc	agtctcctgc	tctgcgtggg	ttcccaattt	ggccctaaga	170047697
cttttctgtt	tgtatgatca	gcaaaaggac	atcaaatact	ttccatcctc	170047747
caatgagcag	aacacattct	gtggtcagaa	gccttctcat	tacttctgat	170047797
ctcaaaggga	catccagagt	tgcccaaacc	caggccaacc	acccttccat	170047847
ttagccacag	cctgaagatc	ccaactatga	tcaacaaata	agactgactc	170047897
cagatcccac	tctgccaact	gcctacctaa	tacccagact	cttgcagctg	170047947
agagagtctc	ttctaaaatc	cagcccaaaa	ggcacactag	atgtgaggac	170047997
cagaatatct	tgtattttgt	agtctattat	agcaagcata	ataaacttat	170048047
ttgtttgaga	ccgagtctca	ctctgtcgcc	caggctgaag	tacagtggca	170048097
cgatctcagc	tcactgaaac	ctctgcctcc	cgggtttaag	cgattctact	170048147
gcctcagcct	cctgagtagc	tgggattaca	ggcatgtgcc	accgtgcctg	170048197
gctaattttt	gtatttttag	ttgagacatg	gcttccccat	gttgaccagg	170048247
ctagcctcga	actcctgacc	tcaggtgatc	cacccacctc	ggcctcccaa	170048297
agtgctggga	ttacaggtgt	gagccactgc	ccagccgata	aactttaaaa	170048347
ttactttttc	tattccatat	catagattct	gggaggaaac	aaggcccaat	170048397
ttgagtaaaa	gcaactgcat	ttagctggct	tgaacttctt	cagagaaaga	170048447
acaacataaa	atattcagct	catctgattt	tttaatgaca	tttccttttt	170048497
atttatattc	aattacacaa	gtaatacatg	aacagattct	ccctttttta	170048547
aaccatccct	tattctacag	atcaggtgaa	agtacttgtt	gctggcctgt	170048597
acttcccatc	cccacttttg	tccccaggac	aaagtactat	caggatacta	170048647
gcattcagag	tgagcagatt	cctagtactg	acataaggag	gatcaccatc	170048697
taatttttaa	attttaaaaa	atgaacacaa	agtctattag	aggaatgaaa	170048747
tgaacctgct	ttgtaggtac	ataatatttc	tctctccaga	gagaaaggag	170048797
gagagcacac	ataagatagg	aagatgagag	ctacaataaa	tgagagaaga	170048847
gagaaactgt	cagaaatagc	agggcagaaa	gagggaaaga	ggtgagaatg	170048897

FIG. 1.128

```
agagagaggg ggagggagga acagaggaag atgcgaacaa ggagagtcac  170048947
tcagttctga ggcaagcact tgattctccg tggttcattt gggtatccaa  170048997
gtaagttatt tcctataatc attggccttt aggagtctgc ttagctaatt  170049047
aacagtttgc aaattgccaa ttgtttttg tcccgcattc tccagagact  170049097
ttacactgca aaggcagacc acagcagccc accttacact tgagttgtgg  170049147
ccaaagcacc atccccacca gacaaagcca gccccacagc tgaccccggc  170049197
ctgtgagtgt ctgaaaactg gctgtaaaga acattctgtc tagttacttc  170049247
ctcagtaaac tctggggctg ggcactggag gttttctgaa aggaagtgtt  170049297
tggtgtctca cacagccatg tgcttagtat attccatgca gcactccact  170049347
gagccagtgc ccttgaaatg agcaagcact gcagccatcc tcctttattt  170049397
ccctcaaggc aatatccaag gattaaaaag tcagagccgt ctgcagattc  170049447
ctcctctcta ccttgccctg cactttttgt gcccttcctc ttccccctct  170049497
ccagccccaa acctctctcc tgatccacgg tactcctcct gggatgtcca  170049547
ctggggctga tcctccccca ttctccccct gagttccctg ctgttaatct  170049597
gtctccagca aaattaacct agcctatgtc ccatgccctc tggactctgg  170049647
ctgctcgtca atcactctta aaaatccggt ttctccttag gcaatcattt  170049697
tgttttgatt ttatgtgtaa aaaaacctga gtaaattttt tttttttttg  170049747
agatggagtc ttgctctgtt gctcaggcta gagtacagtg gcatgatttc  170049797
tgctcactgc aacctccgcc tcccgggttc aagcgattct cctgcctcag  170049847
cctcttgagt agctgggact acaggtgccc accaccatgc ctggctaatt  170049897
tttgtatttt tggtagagac agggtttcat catactggcc aggctggtct  170049947
caaactcctg accttgtgat ccacgcactt cggcctccca aagtaatcac  170049997
tgctgggatt acagaagtga gccaccgtgc ctggccaaac ctaagtaaat  170050047
gttttaaaat tatactacta acatagcata caggctttag actgttggtt  170050097
gcttttaagt ttgcttactt taaaagctag agagaagatg gttgaggtga  170050147
tcttgtctcc ttcagtattc actctgagcc atgcctcctg aggaagtttg  170050197
ctttagggga ggcattgcta tgttatacac tctacgatgc accagccctt  170050247
gcctcagaag gcaaggtttg aaccccaaca ctgtcttttg caaactgtta  170050297
ccttaggaaa tagattttat ctccttaact cactttttac atttgcaaaa  170050347
tgggtaaatt gtgactacct cacatggatg tcatgagatg aaatgtaaga  170050397
atgtgtgtcc ctggcatata gtaaccactt tcgccaaaga ctgagttatc  170050447
caactacaga cagagaacag ctggtggcct aatcaaaggg agatacaaaa  170050497
taacaatgcc aagactggaa aaggaagttc atcttaggat ttccaagaga  170050547
aaaagaaata tgactgtatt ataataggta tatttattaa gctcttacca  170050597
tgtgccaagc aaagttcttt atatacatga tatacttcat atacattatt  170050647
tcatttagtc ctcatggcta ccaggtgagc accattattt tcccatttta  170050697
cagatgaggc acagagaagt taagccactt acctaggaag ggcagtccta  170050747
gttaagaagc tgggattcaa atccaagagg ctggattcca gacctcaggc  170050797
tctattatga gaagtaccta aatagagatt ggtttaacca aagcctgagt  170050847
cccaactaag ggcaagactg tgacacagag gtcactaatc agaatgaaag  170050897
attgagccag agttgagttg ttggaatgta ttttggtaca tttaggttgt  170050947
tttaagtata tcaatctcca ttccactcaa tggttgagtt cagtttcaag  170050997
ttttccaaat gctttatggg aaagtcatat ttttctccca ttgcagcagg  170051047
gatgccagcg cagccatgct tctcaaccac caagtagaag caaagccaaa  170051097
ctgacccaag aagatgaaca gagggaatcc agggagttcc aacttgggtt  170051147
cacagctgca attctcaaag gatggactaa gccatgtcac ccctccagat  170051197
aacacagtca tattaatagt gaccttttgg aggcctccct aaacagcagg  170051247
tgaagtccca aaatcattag attattcctg gcctcaattg tggcccagag  170051297
ggagagccct aagatttttc catgggaaca aagatctaaa ttctgggact  170051347
atctgggcca tgtccaccct gcaccattta ctacaaaatg ggctgatcct  170051397
atggaagcac actacctgtg ttgtggtcat atagatcatc acctggcttc  170051447
tccagggcta accagttagc atggaaatgg gacacccaag aacaagagga  170051497
```

```
tagaaagaag ggaagggtgg aaagaaggaa ggaagaaagg gtgggaggga 170051547
gggaagagtg gtagttttgg aaggaaggag ggaatcagag ctaaagataa 170051597
tacatgatat gagtcagtgt tcaatgtccc tgaagattag gggaatcaag 170051647
ctttgcttcc aggagaatta acacaggaga gccaacagag atgtggaaat 170051697
ttaggaagtc agaggagaca ttctttcatt cattcattcg ttcattcatt 170051747
cacttgctca tttttacatg aattgactct agaacagatg ctggagatac 170051797
aaagatgcat gagacttgcc cccatcctca acagtcattc acagtctaat 170051847
cagaaagaga gccttgcatt tggaatacaa tatggagtaa taatacctct 170051897
gtgttcagcc tgcacaaaat actctgtatg catggtcata tgtcccttga 170051947
aacaacttta tgaggaagat actactatag tctccatttg acagataagg 170051997
aaactgaggc ttagggaggt caaataactt gcccaagtaa aacaactagt 170052047
aagtagctga accacaaaac agagattcat gcagaaagct gtacaacaga 170052097
agaaaccagg actacatctg cctcaaagga accagagaag gcttccaaag 170052147
aaggcagcat tttaaatggg ttttgaagga tgtatagcag ctatagaggc 170052197
agagaagagg aaaaaagtca tttcaaacag aaagaacagg ttgtgcattc 170052247
aaaggtgaat tgagaggaga gaaaagcatg ttcaggaaaa gacaagacat 170052297
ttgtggccct gggagctgag atatgccctc gggaaggctg gagatgatgt 170052347
caaagacgaa gattggacaa taatgcccat caggccagga gccccctttc 170052397
tggattcgct gcttccactc ttgtgtagaa tgatcttttt aaaatgttca 170052447
tcaaatcagg ccccccctctt attaaacatt tcaaaggttt tctgttctac 170052497
ttaaaaccta aaacccttct tttgtatgca aggcctgaac agcctgcctt 170052547
tatcctgtag acaaagggga gatgggagga ggagctaact cacaaagaca 170052597
gtggttatgt ctgctctact cacacacatc cctactgccc cgcacggtgc 170052647
ccagcacata gtaggtcctc agtagggtgt tgaatgaatg aacaaatcac 170052697
tgatgaatga cggccctaag cagggatttt tctccaaagc ttcctcacac 170052747
cttggaatgc atttgggggc ccaacacaaa ggtttccaac ttcaacagca 170052797
aaaactccac ctcccacaca atgtagagtt acttcttgct catttccagt 170052847
gggtttctgt ctttctccac agcctgactc cttctcaaaa tctctctatt 170052897
cccttccaaa tatacattct aaatatttac agaagcttgt tattctcctc 170052947
agagctggcc tagagttctc ctgatatttc aaagaatttc caagaatagg 170052997
gaaatctcct gatatttcag agaatatccc aagaatagat aaagttccat 170053047
ctgacaaata gatgctcagt aaaatctggt gagtgaatgg attaatgcaa 170053097
aaactaatta tcatgctgtt catggcaagg gatatgataa tttttcaag 170053147
tccaactctg gggcaccctc acttccacgt cacatgatta ggaaaagggc 170053197
ccaggtggca ttcagtagac atagactaag cctcaacccc agccctcagg 170053247
cacatcagtg ccctctctag gctctctctc accaacttta gaattgaatt 170053297
acatcagttg tttccagatg gtgatctgca gaattccttt aaagaccacc 170053347
tgtgggattt gagggaggaa aactacactc tcccaatctc cctctttaac 170053397
ccaagcatct gattgctttc atctgtttta catacttagc ttctgtgcac 170053447
aacttccttt gattaaagag ttccttgcct ttatagtagt ggatgatatc 170053497
taaggatgat gtaaaatact gggtgttagc taaggtttta ccaaacttaa 170053547
agcctttatg cttcataatt ccactttatt gatgtaggaa gacaaatgat 170053597
agacttactt tcaaggtgga tagaagggat gcgacctagc caaggctaca 170053647
gcatttctct atggcaccac tgccatgaca accatcagtt tgaatgcctt 170053697
atgggtgcat cctatgggtt atgcactggc cccaagccat aaccccctagg 170053747
actctagagc cagcagcaaa cacaaaacac tgaattaata atgagtgaga 170053797
tctctgttcc catagctgcc acaggctaaa taagttgagg gggtattgta 170053847
aaacccaaga tgagatcact gagcctctgg tatcaaaaag gtgtatttca 170053897
cagaatgttt agttggacga gagcttgaag agcatggaaa cgatctggta 170053947
tcattctggt caaagaccag aatttagacc ccagttctgc catttgctga 170053997
ctaatgactt tgggcaaaat acttaacttt cctgagagtt agtttcctca 170054047
tctataaagt ggggtaatat aacccacctt gcaggatact ggtaggatta 170054097
```

FIG. 1.130

gttgaaataa attgtaggag aacatttggc tcagtgctaa gcctatataa 170054147
atactccaca agggcacaga gagggaatga cttgcctagg atctcctcct 170054197
ggaaatcaca caacaattcc actagtatca tgtggcccac aggcagctgg 170054247
tgggcacaac cacactggtt cagcattgcc atggtccaag aggcttctgg 170054297
tgcccaggga accagcaggg tcccctgagc gttcctcctc agctcccaac 170054347
acttccctcc aggcaccagt atgcagggca aggtcctgga gggggcgccg 170054397
aaacaccact cgagatcctc actctcagga attcaatata gaaaacacat 170054447
taagacctgt ttacatggaa ctgctgttta taattattgt tccctatggg 170054497
atattcccca ctgcttcctc caatcctctt ttaaactgct caactaatag 170054547
agttttcctg gcttccccag ggagacattc acagatgcta atagagacat 170054597
aattcaaaaa ttgcttgata tacatgccct caattttccc caagaaccac 170054647
ctaagtaaag agccccagac atgcaacaca ttcattggcc agatgcaatt 170054697
taacatgcgt gggattaaat atacaggcta ctacagccag gttgtcatca 170054747
agcagcagca ggcatggcat tttatcctaa ggtaccacca cggccaaatg 170054797
caacaggaaa gaagcaggct gctgggtggg acccctggaa gatcccctcc 170054847
tctgtaattt ccactgcaag cttttcccag gccttttcag gcaaagcggg 170054897
gagttttgaa aataaatccc ccaggcttgg agaagcaaag aatcaatgct 170054947
aagcagctcc ggaaataata gcttccatct ctctgatata taaagaggat 170054997
aaggaaggca gaaagaaggg gcatgatatt atgagattgc aacaatacat 170055047
tgcaacatta cattaaagaa ttacagaaag caagatctag cttcagatgc 170055097
cagttcatgc acttactccc tgtgtgaccc tgggaatcac ttaagctgtc 170055147
tgagacttag cttgtctaat gacaaactgg ggatactaat atcacctccc 170055197
aggattgttg ggaaggtaaa tggagattga caaatgtgaa cacacttagt 170055247
atgtctttac atagtaggta ttcaataaac tcttctatat atcttctctt 170055297
tctgaaaatc tgaatatggg gagcatggat atgcttatat gttggttaaa 170055347
caaatgcatg aatgttgagc aaatcagaaa atactaaaat tagaagacta 170055397
aaaggagtaa actaggaccg attaaaagaa gtttgccttc cccaaaactc 170055447
ataaacttaa tgaaacttgc tatctccaga ggaaattaat ataaatttaa 170055497
aatagcatag gtttgagatg actttagcgg agtttctgga gaatagatcc 170055547
atcactggtt aataaactaa aaatatagag agaactgccc aaggttacac 170055597
gagtagaaat ttggtgtccc caccactcct ttttattgca gagggaattg 170055647
acattcaggg aatggaaatg cccagcccag aattggggat gtggtctggg 170055697
aacccaggtc tcccatccca ctccctcgcc ctctcacccc ctcccgctgg 170055747
tcagtgttct ttgtcctctg ctggcatccc tggggacggg ccagccccca 170055797
tccccccgac acacacacat tgtcccttca agatggagcc aggctgacac 170055847
cacgtagaat gacctggaag cccccactca gtctaccagt cctccctcct 170055897
cacacaggaa tagatgggag ggaaatgaaa taagctgcca tctgctgtgc 170055947
atcctctgtg tgccatgctc tgggtaccca tctaatcctc gtgaagaccc 170055997
tgagaagtga gtgttcttca cagactaggc aacaccagaa ggcaggtgaa 170056047
gaacgtacag aagctacaga gtgcacaggt gacaggtatg agagccaagc 170056097
cattcaaact ccctgggtat aggacccagc tcttcccacg tctctgcctt 170056147
taccgaatca aacacctgag cacggaagac cctccatcaa catgaactgc 170056197
tttgaattga catgaacaag cttcaatcaa actataaatg ctgaaatttt 170056247
tcaattatag aaagtatttg aaagatccca taaattcccc tgtcatatca 170056297
cgtgagctgc atttactgca gcagacactt tttatctcgg gcttggagga 170056347
aggattagca agaagaaagt ggaggggtc tgaggaaggg ctggcagcct 170056397
agaggaggac agcagcaaga agcaggctgg aggcagttct gtgctgccgg 170056447
ccttcatggg tgtggccttt ggacagcacc ttagcaggaa tgtggtggag 170056497
agcagcccca ttcactccag aggagagcct caaactcttc aggcagatct 170056547
agcctaggta gaatcttggc ctggcccctc cgggatgaca ggtgccattg 170056597
cccaagaatg gggaaaggc tgaagtgctc cagccaaaga ccccaattta 170056647
tcttcaggac aattttcact ggaaaccttg cctcaccact gcccactttt 170056697

FIG. 1.131

```
tcagaagtaa ttagaatgct aatctataag aaagatgact attaaaaata  170056747
aattaataat agataataca ttttggctta caattttgaa taatatagcc  170056797
atcccatctt aaagtaaaaa ttcatatatt tttaataagc ctgagacatg  170056847
ttttccaatg aaccacagat ggttcatttt tattatccta taaagagaca  170056897
ttatgggcaa gtgtttttta aaatggtaaa acagaacctt agagcagctc  170056947
tcttttgaag atctctaagc actttctaag catcaggacc cccttctgtc  170056997
atcacagaga ctgaaatgag gagatggtct ctgtcacccc ctcactcacc  170057047
agtgagcccc agaccttcat ccctgatcag atggaagcag tgtggcatga  170057097
ttacagttca tatttcaact ctgccactca atgactaata gccaagcact  170057147
aataatgcag aaaatgtaaa tttaaaaaat aatcttcctg agattggtta  170057197
tgaaatgcac tcaacacagc accatccaca gagaggttct ttttaattgc  170057247
tcttttcttt cctctcgaca cccagaatca caaagcatgc ctgaaagcgt  170057297
cacacatata tgtctgtgac cataacatgg cattgcacat gcaaaggaaa  170057347
taaataggtg ttacccatgt gacaaaggtc catgagctct gtccgcaaaa  170057397
agctgttgag tttaaagaac aaataattct gaaaaatctt ccaggagatg  170057447
aaatttgtag aactcaaggg cagtaaacta gctgctttcc aaggacttgt  170057497
catagcttta ttgacttaca atagccaaag ataagtcagt attaatcaaa  170057547
cccattctct agaaaaacct catcatcact ggggccaggg cagagaagtg  170057597
tgacacagct ctctccagct tccccacttc acagcatggt tccaccatcc  170057647
acccaattgc taaagcctgg atagtcttcc ttgtcacctc ccgatcccct  170057697
tctctaacac ccatcccccg gccacccaac atcagcaagt ctggtggttt  170057747
ctctctgtca cagagattca agatcttccc ctcatctgtc tgtttcaaag  170057797
ttaacatcat ctctcatcca gacagttgca acactctcct agcaggtcct  170057847
tctgcatcta tttttaatt aaattttaa agataaaaac attcctctaa  170057897
atagaatctg ctccagaacc cagattaaaa aagaacgaga aggggaaag  170057947
aagattaggg catcccagaa gctccctatt tgccccattt gattcattac  170057997
tccccaaagg taactgctat cctgacttct agcaacactg gttaatttcc  170058047
gttgattttg cactgtatat tcatccgtgc tgttggacac tgtcatactt  170058097
gattcattca cattgctgtg taacatttca ttgtgtgact attttaacat  170058147
ccattttact gttgaacact tgggtaaact tctgctttga ggctattata  170058197
aacttgacac ttctgcttcc cattgcttta aagataagag cccaagtcct  170058247
tgtcagacag gtgaatggtc cacacagtta gcatcctagg ctgggcgcgg  170058297
tagctcacgc ctgtaatccc agcactttgg gaggccaagg cgggtggatc  170058347
atgaggtcag gagatcgaga ccatcctggc caacatgatg aaaccccgtc  170058397
tctactaaaa atacaaaaat tagccaggtg tggtggcatg cgcctgtaat  170058447
cccagctact tggaaggctg aggcaggaga attgttcgaa ccagggattc  170058497
gaaggttgca gtgagccgag attgcaccac tacactccag cctgggacag  170058547
agcaagactc tgtctcaaaa aaaaaaaaaa aagccaggct ttttctcatc  170058597
tcataatctt tgcgcatgct gttccctctt cctgaaactg ctttcctacc  170058647
acttctcacc tttatgcttc acctcgtagt gttcatagac tctccttcct  170058697
tcctaactta aaagaggctc cttctggttt ttccttcata cacttccctc  170058747
actcttttcc ttcactgcac taaagatgat ttctaattgc atagtcattg  170058797
atgccagtat ttgtttattg tgtcattcct gctgaacaga ggatgggcct  170058847
gacttatttg ggaccatgtt gctgatgcct ggacctaagc ctggcacaga  170058897
gtaggagctc aacaaatttg ttaaatgagt ggctgaatgg ccatactctc  170058947
aaaggaccca cagtctagga gagacagaag aatctttgtc tttttgtctt  170058997
gcagtgggat ggaagctgca gggaggggtc ttgtcacatt gatactgtct  170059047
ggggaagaca gaaaaacttc agtttcagag gaggtagccc ttgaaacgag  170059097
atttgagaga gggcagcaca ttgtacaact ccatgggcac catgcacatt  170059147
gtagtccaga taaacagagc cccttggaga tatgtgaggc atgggataga  170059197
ctcagagaaa cccaggaaat aacccccttca ggcatctgac atgcaaagat  170059247
gtggaagtgt caaccaggaa gtcatgttgg gggaacagca agtatttaca  170059297
```

FIG. 1.132

gaaagtgact gtgtgtgtct gtgtaggagg gtgactttgt ataggagaga 170059347
taaaacctgt gagctaatca aggagaagat cataaaagac cttcataaag 170059397
agcatggcct ttttcctgca agcagtgagg agccattgaa ggctttagca 170059447
taaggacagt cagatgtact tccctagaat gcacatttcc ttctgctcca 170059497
gaacttctgc acaggaggct cctaaaagct ctccccatcc tccctgtaca 170059547
cgtagaatct gcctctgtct ctctttctct ctcctcctcc tcctccatct 170059597
cctcctcctc ctcctctccc tctctctcgc tgtctcacac acacatacac 170059647
acacactcct tccttcctat ctagtcagat tccactcctt gggatttcag 170059697
gcccaccgtc actcctcagg gaagcctgcc ctgaatgcct gcactacacc 170059747
agggcccctt tcccctgccc ccatcccaga gcaccaaata gctttccctt 170059797
gcagcacttc tcacagctgt cattttatgt ttgtgtctgt gattcttagg 170059847
ttaagtccct catgcaccaa atcataagat ctgggaacaa ggaccacacc 170059897
tgtcctgttc atcactgtaa tcatcacact gcctgccaaa gtgccttgca 170059947
catattagat acttagtagt tatgtgttcc atgaatgact ctttaagaga 170059997
tcttctagct gttcttgcaa agaacccatt ggtaaggttg aacctacagg 170060047
ctgatacttt gcactagtct caggaagaga tggtgagtac atgaaattga 170060097
gtcccccaga ggttaatgcc cagtgcccca gctaggaaac gtccaaggag 170060147
gcaatttgaa ccccatctgt ctggctgcag agcctagccc tctaatgcat 170060197
tcaggggtcc tagctcctcg aggatgccac tgtgccgtga acttctttct 170060247
gaccctcatg gctcccagca cagcatccac actcagaagt gcaagatgaa 170060297
tgtttgcaga taatgaacat aaagctctca ggaaccctca tctcctgaga 170060347
atctgctttg gcccccacag caggtctggg tgtggacctt ccccaatggc 170060397
cttgggaaat tatcaacatc tccccattag ctgttgcaat attaaattgt 170060447
gtgactggaa atgaatgaat aatcccatgg gcaagtgagg gagaccaagc 170060497
agcagggatt taataacaag tcctgccctt tctccaagca gaaggtcttc 170060547
ctaattaaat attaaaaatc tatccataca agcaagagcg aaaaattgca 170060597
ttttcagcag tgcagctttg agatgctgcc tcagaagacc caagagctgt 170060647
gggaatgccc tctccaggac ctagaagagg gggccagaaa accgccatgt 170060697
ggtaagcact gccgggtacc cgggtatcac aggccttgcc acattcaatc 170060747
ctcatgggga caatgagaca ggggttagat cacagccact gtctaaatga 170060797
gcaaactgag gcttagagag ggttagtgac ttacccaagg ccaccaggta 170060847
tcaagtggca aagttgggat cttaacccag ttctatgtgg ctataaagtt 170060897
catggaatag aatgctgcag ttaagaacat gggctttggc atcaagcaga 170060947
cctgtatttg agccccacct ctgctgttta ttaactgtgg ccctgggcag 170060997
atgaccttac atccttaagt ctctagttct ttgtctttaa aagggtggca 170061047
gaatgtacct cactggtttt aggaaggtca catgagatag tgcacatgaa 170061097
gccctaggca tgggaaaatt cttctaaaat gtcagctgcc attctgatca 170061147
ctgcaagacc cccaccccca atactcccaa ttgtaccacc ccaccccact 170061197
caccagtgtc tcagaaatgc ctcctccaga aggaaggcat cctgtctaac 170061247
ccactgcttc tagccaagct gtctttcttc agaaggtaga aaaagattgt 170061297
tagtcattgt ttaatcttta ttgagtatat accgccacac caattgcact 170061347
gccattcatt atctcattta aatctgacaa gagccttgta aagtagggat 170061397
tattcccacc atttcccaga tgttgaaact gaaattgata aacacgacat 170061447
gttgccatgg ctacatgaag atctccaagc cggaggatct ccaccctcac 170061497
ctgcctagct tcccagacct ctctgcagaa aagggactga cccccaagac 170061547
agccctggcc tctgggctcc acccсttcca catccatccc agggccgctg 170061597
aggactgaag agttctccac gtttgccctt taaagtgact taaaaataat 170061647
ctttatgaat ttcttcatat acaaaatttg tacttactca ttgcagcaaa 170061697
tttagaaaat acacataagc aaaaaagaac gtaacagcca tccataaccc 170061747
taactctcag agatcaccac tattaaaatg tttattatct aagagagaga 170061797
tgatatagac aaagatgaga cagattgaca cagagaagat gggtacatga 170061847
tagatatttt ctgttttata acccttgctt tttcttgcac ttctaggaat 170061897

FIG. 1.133

```
ttttctgaga actaatctga aatctgcaca gggtccccac gtctcggatc  170061947
ctcatcccat tgcctcccac cttcttgaac tttgcttcaa taattatcac  170061997
acctcctttg catgtttaat cttccccctt ttaatgacaa ctaccaagac  170062047
ctgtttccta gtgcagggtc atgaggtaac taaaataaga attaaattgc  170062097
tctgtgaaaa aaaaaaaaaa aaaaaaaagt tttacagtcc caggagattt  170062147
tctccagcct tatcatattg ttgataccat agggtcagtt ctgaagctga  170062197
gcccaactca gccctaagct ttctaaaggg gaattgccag gtcccctggt  170062247
attccagctg aaacctcaaa catcctaaat tgtaggctct attaactaat  170062297
aaggagaaac acacttcctt ccccttccca tgacttgtag ggagtctagg  170062347
gtctcaggcc tatgtcacag gccctcgatt gccatgagtc agcaaggaga  170062397
ggaaggacac gaagccagca ggcagagagc tggccccaca gagccatcct  170062447
ccgtgaagcc ccagcaaacg ggagggacca agtttgtttc agttttccta  170062497
aaaataacaa gactgtattt tctttgctgt tggctgtccc taaaactgtt  170062547
aacatgggtt cccagcctgg cacaatgtgg tccatgcctg cctcccacat  170062597
acctgcctcc cacccctctg ggccttgttc ccttcatccc agcctccaga  170062647
cacacctgcc tcctgtcatc tctagagcag gcttatcttg ttctcctgtg  170062697
ggctccttgt agaggatgtt ccctctgccc agaacgctct ccctcactca  170062747
tcacctgttg gtccccttct cctccttcca ggctctgtgt caaggccacc  170062797
acagagaagc cttgcggtta tgtttagttc ttcctgccta agttcgcatg  170062847
gtaacccata cctttcctcc atcataattt gctcaactgt aatcaaacat  170062897
tatttttaaa aaatcattcc agcctgggaa acagtgagaa acccatctct  170062947
acaaaataaa aaataaaaat tagcttggca ttgtggcatc tgcccgtggt  170062997
ccctgctact caggaggctg agatgaaagg atcacttgag cctgggaggt  170063047
tggggctgtg gtaagccgtg attgccccat tgcactccat tctaggcaac  170063097
agagtgagac cctgtctcaa aaaaaatatt attcatttaa tatctgttgc  170063147
caccacagga ctgatccctc tgtgagggca gagattgttc atgcatggaa  170063197
ttgtgattta taagcactgg ctctggagcc aggttgcctg agcacggagc  170063247
cagctgtgcc ctgcgggaca cctgtggcac acttcactcc tgggacacct  170063297
gggacacgca cacaatagaa atgttcacat tttactaggc aatgccagtc  170063347
acatagtcct acctaatttc aaaagggtaa aaggtacacc caacacgcat  170063397
caggaaggag gaggaccaga aattgttggt gacaagcaca aatgaccacc  170063447
ccaatataat attttgtttg gaaggcattt tattccacaa aaacaacatt  170063497
acaataaaca caacaacaaa acactggttg cagtagaacc aactttccag  170063547
acctatctgc acagcacaac cattatccca ctcaaaatgt catgttttta  170063597
cccaaaacat taaaatttta aaagcaattc aaacccatag cttaaaaaat  170063647
gttccaacca gtaataaaag gaaaagtgtg cctcctcctc ccaacttccc  170063697
taccccacaa tcgcaagata ttatccttat aggcgaaaag ggtttcagga  170063747
tttgagatgc aggctgggag gtctgagaag acttcctata gaagacatga  170063797
cttcaaactc tttcttgtat gtgagattta attttcaaag actcctctga  170063847
tccaacttaa gctttatggt aaatcacctt gggacttaaa tgatgagaag  170063897
cactgctatc tcacagtgag aaattcagaa gggctgggag ttccaagtca  170063947
gagctctgat ctggaaagtt ccatcaaagc gtcactccag gcttagcggt  170063997
tgccacccac cactcgtcag actaaacagc ctcagagccc tgtgacctgc  170064047
taatgtattc acaaactaac tcagctaatt aatcccagct cattcatcct  170064097
ctcaaactat gcaagtcttc cagctggccc tccggcttgc tgccctggct  170064147
aatggagtgt tacgtggact ctctgtaggt tgcaccttac tcgcagccaa  170064197
gcaaaggcac tcattaagaa gctgagcccc agggctcccc catgagtggg  170064247
gaggaaactc atgagtgcct tctatatgcc agcgctctat ctgcaggggt  170064297
tcttttgata gcagcagact gagagatgat gttactgtcc cctttttcct  170064347
gttgttggca actgagactc agaggatgga agtgacttgc tcaggtccac  170064397
cacctcttca gctgtggagc tgcgacagga gcctttgttt gacttcaaag  170064447
ctcaccatca ctcctctctc actgatgctc aagtgggcta tcacctcgcc  170064497
```

FIG. 1.134

```
tttcctgagc cttccttcgc tatcctaaaa cagcgcctcc cgaaatcacc  170064547
actaaagaac ttattcatgt aaccaaacac cagcggttcc cctaaaaacc  170064597
tatggaaata aaaattaaaa ataaaaacag tgcctcccat gacccatgtc  170064647
tctccagtcc cataactctg ctctatttcc attcacagct ccatccccac  170064697
ctttatgtct tttgttcact gctttatccc cagtgcctag aagagtgctt  170064747
ggcacctagt agacactcag taagtatttg tcgaatgagt taataaggtt  170064797
gtgaaaagaa cgttagatta ctggaaggat tcatctgagt ttaattctgc  170064847
tatgctggga atccagtgtg cggccttgga tgaagccagt tccctccctg  170064897
ggccccagta gccacatctg tacatttaga gggcaggaga aaagccacac  170064947
gctctgtgac ttatacaact tgttgcccag agtggaggct gctttgatgc  170064997
tcagaaaaaa gaaacaaaca tggaaatgct aaatgggtgg cagagagctt  170065047
gagggaggaa ggagatgggg agggtactct tgaaactgtt tggtgtcttc  170065097
cctcctgccc cctcagtacc aattgtcaag tacagaaagt gaaggagact  170065147
tgtattagtg gaatttggtc cctgacttgt tatagagaca caattacaaa  170065197
gacacaagag tgggcccagc agagaccctt agggtggtcc cttgaggttc  170065247
caaagcatct gcccatcaag cagatgatgt gattagtctc tgtgacccca  170065297
aggatgcctc ctgaaattgc tgattcaatt tctcctaata aaataggaac  170065347
aataattagc taataagaaa tcaacaatta aagctatgag agaattaagt  170065397
gagatcatgt aagcaaagta catgtcacag tgctctgcaa ataggcagtg  170065447
ctcagaagtg tcaccttttc tctttcttct ctgagcctcc gtcttctctt  170065497
cggtaaaatg agaataatat tatgcatacc tcacaggggt taagcaatgt  170065547
gaaagtactc tgtaaagtat aaggctgaaa tgtactgggc tcagaaccta  170065597
taggtctgtt ccattctcga cacacgtgat attagcagca cggtacattt  170065647
aaggacacgg cttgattctt taatcacagg gcatcctgtc ttctccacat  170065697
tgcttgggac cccaaaaaat gaagttctgt catgtctcta gaccaccacc  170065747
aaacacataa aagtcactta ggaaaacatg gtaggaggca gaggaaagga  170065797
attgttgaac agggattgca gattcaggta tataaacgag tgatgatgac  170065847
tctaacaaca gctcttggtc ttagtgttgg aaatgtaata gggagtagtg  170065897
gggactgcgg tttaattgtt gccgtgtggg aatgtgggcc tggcatggcc  170065947
ataatttcag atttctaaag gaaagccaaa agttcatatt tttatgtgaa  170065997
ataaatgttg ataaagttca cacttaaatg aagtgaaaca gaccagggct  170066047
ggtggtttat acctgtaatt ccagtgcttt aagaggccga ggcaggagga  170066097
tcacttgagg ccaggagttc aaggctagtc tgggcaacac agtgagaccc  170066147
catctctacc aaaaaaaaat taatttaaaa aataaaagaa gtgaaacaac  170066197
agtaccctgt gggctgccag attgtgattt ctgaactaaa ctgtcagatt  170066247
acaaagttac ccgctaaatt agccaaatac tttccagata ttccctgggc  170066297
cactgtctcg ggactcttaa tatattttcc aattagttcc ttttagtgct  170066347
acatacacac ttttagcaaa taatgagcac ttactagtca ctttctatgt  170066397
gcaaagcaga tattagacat cacagaggga gtgagatacc gaaaacaaaa  170066447
ataaaacaaa aataagcaca agacacaatc tccgcctacc ccacccttga  170066497
atatgaaaac tgtgacaccc aaaggtagat tttgatacct gctgggtgat  170066547
tgctagagat aataagtgct ttgggaattt ggacagagag agcttttttt  170066597
tgcagtggtc tgagagagct gcccagagga gatggcactt acgccatgtt  170066647
ttaagggtgg ataggattag tgccagatga tcacatgctc tggtagacag  170066697
gggtctgtgc accagtagat tctggggcta ttgcagagga ctcatgacag  170066747
ggattagtct ctgtgacccc aaggatgcct cctgaaattg ctgattcaat  170066797
ttctcctaat aaaataggaa caataattag ctaataagaa atcaacaatt  170066847
aaagctatga gagaattaag tgagatcatg taagcaaagt acatgtcaca  170066897
gtgctctgca aataggcagt gctcagaagt gtcacctttt ctctttcttc  170066947
tctgagcctc cgtcttctct tcggtaaaat gagaataata ttatgcatac  170066997
ctcacagggg ttaagcaatg tgaaagtact ctgtaaagta taaggctgaa  170067047
atgtactggg ctcagaattg gggaatcgtc tggaaaggta gaccagggcc  170067097
```

FIG. 1.135

```
ctagcgtgga ctcttcagcg ccagcaggaa aatctaggct ctgtcttgaa  170067147
ggttcctcag caggaaggtg gggggttgtt gtggggtgaa tctgatggaa  170067197
agggattcct cctcctcctc ctgctttctc cagggtgagg aatctaggca  170067247
ctagccctgg ggcccctcca ggtcccactc ttcacctctt gtttttttatt  170067297
tctcctgcca tacaaccttc tttttattta aaatagattt aagcaggata  170067347
gagccccctc ccccaccatc aaggctgttt ccttgtaggt ggggggatgc  170067397
cttcatggta atgatgtaga ccctgagaca atatagagag gcagcagggc  170067447
ttggaaacag gcagtatttc ctctttttat gatggtttca ttttacattt  170067497
ttattggcct ttcactgatt gctcccgggc tctctggcag gatgtgagat  170067547
gcgctgacat ttatagaaat caatacatta ataaatcacg aagttcataa  170067597
tgtctgattt gcttctaaat gagacagaac tattatcgcc ataaagttgc  170067647
acataaaata tgcccaattg tgatgtattg tgtagtctaa tcaaaggcat  170067697
ttgagtgaat aacctttccc caaaagaagg aaacaatcaa agctgaataa  170067747
cttcattaat aattcaaggt gtgtctgcca aggcttcatt tattaagtgc  170067797
acagttaaga ggcttcagag ctgaatcctg gagaggatag caccttgcca  170067847
tcttctccct gcctctgggc aggcggatat acattctcag atgaactgac  170067897
tgcactcctt gcatctggaa gttcatgttc cagtggaggg taatgcccag  170067947
ttgacttctt cagctaagag atggcccgta acagtgctca tggactgtcc  170067997
ggattcttaa gggcagagga gccagagcca ggaaatgtcc ttagtggcca  170068047
tcagttgtta tgtctgttca ctaatgttcc aggccctatg cttctggtgt  170068097
ccaccaccca cagacccccct gttctgttcc acggactgag atgatcaaca  170068147
gtctttcatc cagagggttg tgtttgctgg tggccattac ctttaacata  170068197
aaacgatcat atttacttta tcctattcat gtccaacctc aactgacaat  170068247
tgagttgtgt ctctgacaat aaatagcaga aaaaggaaat cttcctatac  170068297
tgaagagaaa cacaattaat taactagatc catcaggaaa ggtacaatca  170068347
tgattgagac agtgtttaac agatgtgact attggattct gttgttgaga  170068397
atgaccctta aaatcacagt caaaatatac gacaagatgg aaataacatt  170068447
tttgagcacc tactatgcat gtagagcatc ttacatacct tatctcactt  170068497
agatttacag ctgcaaggtg ggtatgattc tagcttgaat tagtctaata  170068547
accatatacc tcctaggggc agtgagatga ttagatcaat tctaaaacta  170068597
ttaccatgct ctctgagctc accaagacag gcagttaata caaggataca  170068647
ttaataccga atccagcaaa agctcacatg gccagcttcc attatgttcc  170068697
tatttgtgat tattctgtat caagcacaga aatgtatgtt cacacgaaca  170068747
acaaagaagg ggtttattag tgtggattac agggcctaag cctaccctct  170068797
gaaactggtt ttggagtctt tagcacgctt gtttgggaca gttaaacatg  170068847
tgccagctat tctaaaacag tagcagtaat gtgatagagc tgggtcatac  170068897
cgtgcttccc aaagtatgat cacttcattt caacaacttc acactaacag  170068947
cctgaactgg gctgtgaagg gaatatttag accaaggaaa ctggaaaact  170068997
gtatcaatca ggcttttcca ccctccccaa gagccagttg tcagatatct  170069047
accagcctac caacgctagc tctctaatca gaaaccatca cttagcaagt  170069097
tcccaaatta tctgcagagc aatgaactcc tcttcttcag aaagcaggct  170069147
gaaagataca ctgttcacat cttagcctga cctggaccca gtgagtttcc  170069197
atcagtgaga aaattctgtg ctaacttgag ataatactat tcttgtggca  170069247
attttacttt tcctttgagc gattccttca acctctctct gccccttcat  170069297
ttttccgtct taaaactaaa agtgcccttt ctccctggac actcctcatt  170069347
tgcaatgaat tgtcatttca gctcctcagt caagaggagt aatgaaatcc  170069397
cacccgtgtt aatcctctta tatcccgcag aaatattgta gacccactca  170069447
ccctaggcaa catgccctct ctcttcaaca caggtcatca attgttcatt  170069497
tactggctat ctccatgtac tggaacttca gggtggtgtc cagctgggtt  170069547
caaaggagaa acagtgggaa gtttctccac tgccacctga attagatgag  170069597
aaagagttgt ctactgaaat acactagctg gtggcaggat tgggacgtca  170069647
tttgactaat tgcctcctag agctgcagag actgctggaa ctacctaagt  170069697
```

FIG. 1.136

aaatcatcaa aaaaaaaaaa aaaaaaaatc atcccagggc actttttcca 170069747
gacaaaaagg tccacttaaa acatcctcta gagatctgtg cctgaagctg 170069797
agctgctgca atgaaactga catttctgcc ttgcagcctg gccatgggct 170069847
tagctggact aaaatgctgc tgcagtggtg agggcacgtg agagtcccta 170069897
atgtacatgg ccttgctcct tgtcctgaca catcttttag ggctgctgct 170069947
ttctctagtg ctggaatcta gataattcct ttcccagccg tttgtttctt 170069997
caatcttgga aaatatctgg atgaatgtaa cactgtcaca cacaaacaga 170070047
attatgactt acgtcacatt ctatgtcgtg atttgtgga cttttaataa 170070097
ttgcattaca tttgtgacca ttaatttcca ccatcgccct gctcctgaga 170070147
atctgtaagg gacatttgac actcctctcc ccacccacct caacatttgt 170070197
gctgacctga aggtcacatt aaaaacatac ccatttggag agaaagatct 170070247
gtctactgaa atacactaaa tattgaagaa tttccaagtc atttgatctt 170070297
gaaaactcca tctaatggaa gcagaaacac tcaaaggttt tttttttgg 170070347
actccctttt tcaggacact ttcaggactg aggtatataa atgaatgaga 170070397
aatgtataaa ttcaatttca cttaaaagga gcaggagggg tttcaagatt 170070447
aagagaacaa atgcttgaag caaaacatga tttgagtttt attgaaccga 170070497
gaagactgaa aaaaatacgt ggaacactca gaaaatcttt atcaaggctc 170070547
agctgagcac tcctggggct cattgttaag tttataaaac tcagagctga 170070597
tgagttgtgt gcactgtgtg ggtctgagtg ggcttatgac tcccctccaa 170070647
gcctggctgt aagaatctaa gacttaaagc tgaaggacca aatgggactt 170070697
tccgtcccat cccctctctg ctccatgcaa gcaccaacgt ggatttttgc 170070747
ccctaattat attagggaac gctgtcaatc aaaaagatga tgttaaactc 170070797
atccagaaca aaccaaacca tgtttaaggg gaagaaaaga ttacatcttc 170070847
aaatgccagc atgccatcat taatacaatg tctaatgtag tcaatatagt 170070897
tcaggcaaca ttgaaaatga accactgcaa atactaggaa tacaatttca 170070947
agaggaagca caacattctg tgtttctatg cacacagtcc tgtaaattat 170070997
ttgcagctca agtatgtcat gttcttttaa atttcccct gggtacagct 170071047
tgaacaactt cctacaagtg ttgatatgtc atattctcat tatcatttag 170071097
ttcaaaatta ccatgattta attaccatga ggttgctttt ttgatacatg 170071147
agttacttag aaattgaatt aggctaggca tggtggctcc cacctataat 170071197
cctagcactt tggaaggcca aggcaggagg attgcttgag tttgaggcca 170071247
gtctaggcaa tatagtgaga cctcatctcc acaaaaaagt acaaaaaaac 170071297
tagccaggca tggtgacaca tgcctatagt tccagctact caagaggctg 170071347
aggtgggagg attgcttgag cctgggaggc agaggttgca gtgagtggag 170071397
atcacaccag tgcacttcat cctggatgac atagcgagac cctgtctcaa 170071447
aaaaagaaaa aaagaaattg aactatattg cttgatttcc aaatgttttt 170071497
gaggattttc taattttctt ttggctattg atatgttgct taattcaact 170071547
ctggacaaaa acagtctata acttcaattc tttaaagttt tttgagattg 170071597
actttatggc ccaggaaatg gtcacttttg gtaaatattc tatgtgcact 170071647
tgaaaaaatt tatagtattt tatgattgct gagtacagag ctccatacgt 170071697
ctcaatgaga caagtttctt aattatgttg ctcagatctt ctatacccct 170071747
attgattttt ttgtctgttt atcagctgct gaaagaggta tttttaaatt 170071797
actccaatta tgactgtgaa tttattattt ttccttttaa ttctatcagt 170071847
ctttgcttta tttgtatttt gaagctacat tattagtaca tattaattta 170071897
gaattgtttt atcttcctag cagatgggcc cttttacata agaattctct 170071947
atctctagca aagttacttg ccttaacatc tactttagct gatgtaaaca 170071997
tagctgtgcc agtgtttctt gatttgtgtt tgcatggtat atccttttcc 170072047
atcattttac ttttattttc tgtgccctta tgcttacaag cagcatttaa 170072097
tcagggtttg gtttatatct gatgatttct atcttgtatt gtagattttc 170072147
tattttttaa tttttcagtg gttttactct gatgttctta taagtggttt 170072197
tctttgtgtt tatcttgctt ggggtttgta gtgctccttc actctgtgac 170072247
ttgatatatt tcactcattt ttttaaaatg ttcatttatt agctctttaa 170072297

FIG. 1.137

atatcgcttc attatcatta tttatctctt tcttttctga gactccaatt 170072347
atacatatgt tcaaactttt catcgcgtct catatgtctc ttatgcaagc 170072397
ttatctgtga ttccattctt ttttttctt tttttgagat ggaatctcac 170072447
tttgttgccc agcctggagt gcagtagcac aatctcggct cactgcagcc 170072497
tccacccctt gggctcaagt gattctcctg cctcagcctc ccaagcagct 170072547
gggactacag gcgcgcacca ccatgcccag ctaattttca tatttttagt 170072597
agagacggga tttccccatg ttggccaggt tggtctcgaa ctcctgacct 170072647
caagtgatcc cccgcctagg cctcccaaag tgctgggatt acaggcatga 170072697
gccactgtgc ctggactgtg atttcattct tttctctctt gtgcatctgt 170072747
ctgtgcattt ttctattgac ttatctacca agtcacttat tatctcttaa 170072797
tctgtgtcaa acccactttt aaattggtct gtttaattgt taatttggat 170072847
aacatatttt tcaattctac aatttttgat tgactttttg tatatattct 170072897
ggttctctgg tggaattatc tagctttttg tatattttct tgaacaaatg 170072947
ttcaccatta ttttaaagcc cagatatgat taatccaatt atctagatca 170072997
gctgtggatc tattactgta ttctattttt tctcttagtc ttgtctctta 170073047
atatgcctga cagattttta ctgaagggtg cacattggaa taaaaaatgt 170073097
gttacctatc tggttgagtc ttcagcttca gaaaggtaat agagcaaagg 170073147
cagataaatc caaacaggga ctgagctgtt ttcatgcagg ctgccttggt 170073197
agctctccaa agccttcaaa aatgatgaga ttttttttta aatccttttt 170073247
atccagttgt tctcaaggga ttccacccct gcataggaga gctcaccatt 170073297
cctgggatct tcagcttcta tgcctttgca tatgctcttc ccttgttccc 170073347
tcattcttca acactcaact gaattatcac ctcccttgaa gccttctctg 170073397
acatcccttc tagtcccatg ccacccagga ggcactaaga gcttcctccc 170073447
ctcagctccc agttcttaaa catgtcaaca ctgttttgaa atgatttgcc 170073497
aatgaaaaat tctagaccag caaccaacaa catccttccc aaaggtgtgt 170073547
tatatatggt acatgctgta tgtgctaaac accaaattca ttgataacag 170073597
ctaagaacca ggaaacaaac catcgttaat tatggcatct cttgaaaaat 170073647
ctaaagatct ggactcactg ggcttaaatg actgcatgat aacaactggt 170073697
tgagtaacaa ctgtttccct ttcatggagc agttactctc cagttctcag 170073747
ttcctaccac tctctatagt tgtacactca tcatctgtcc tcatctgaat 170073797
tacctgccaa tgactactgg catttgagtt tctaatccat ggtctatgtg 170073847
tatgcctcct caccagtgtg agaactcatg taaacaggta ttatgtcttt 170073897
tcatctctct cctaatacct aagacattcc tggcacacca gagcatgtca 170073947
atgcttctaa acatatctat attaaaatgc taccaaagca ttcagggtag 170073997
tgaaactatt ctgcgtaatg ctgtaacagt ggatacatga cgtcatgcat 170074047
ttgtcaaaac ccacagaact gtacaacaca aagcatgaac tctaatgtaa 170074097
actatgggct ttagttaata tctacatatc aataccggtt catcaactgg 170074147
aacagatata ccacaccagt gcaagatgtg aataatagga gaaactgtga 170074197
gggcggaata tacacaaact ctctatattt tctgtgcaat ttttctgtaa 170074247
cctgaaacag ctctaaaaat aaagtatatt tataaaaaat aaataaatac 170074297
aaatgccacc tcaccagaag gatcaaaggg gcaactaaat ccagcaaagt 170074347
aagtgtctca cgtggaatac aggtcaggaa atgagtgaaa acactccaat 170074397
ggatgcccac ctatacgatc actttgaaga gcagcaggaa aataagcctc 170074447
tgctgtctgg gttgcagatt gggggacagg agagaaacta atacacactc 170074497
aagatggtgg ctgagctgcc ttacacactc gtggccaggg gtgcttgcaa 170074547
gacaggcgga agttcaaata agagcctaca gaggaaatcc aggccaacca 170074597
caaaatagac ccacaaaggc cagcaggaga gtatctagtg gagctccctg 170074647
ggaccttgga ctcacccagc tccactgtgc catggataat tttccaggtc 170074697
tggtattttg tcttgtattt tatattctgc ataatggggg acttggccgg 170074747
catccactct gccacacatc ctaatgggct aaccctcttc tgcaactacc 170074797
cttttctttt tctgcatctg gttactaatc aagcttaatg ggggaagaaa 170074847
gaatcaaaaa cttgtagact gtaagctcca agagaacaga gaacagagct 170074897

FIG. 1.138

```
gttttattca ctgacttgta cctagtagat acttcattga cagttattgg  170074947
gtggagtgag caaacaaata atcctacaag atatgcagtt tccaatcaca  170074997
aagaagcaga gagggggaat gggggcctcc tgattgtgga gggtatctta  170075047
taagcctctc ctcagtcaaa catgcgagtg tttccaagga cccatccaac  170075097
attgcacatc tctgccatgt gccatcccat ctctgcaggc tgcatgactg  170075147
catggctgag ggcatgttca atgagcccct gtgggagcca tgggcactgg  170075197
gaggcaaccc actgctcttg cctgttctga ccatgggaaa aggacaggga  170075247
gctcagctcc agctctgcta ctgagaggct cttcgcatat gtcaagctgg  170075297
acgacgtgga caccctcaga gcggcctctc tccattgaca ataaaagtgt  170075347
gttttgcttt tcgatgaatc gatttggtaa aatgttttct cactctttcc  170075397
tagACATCGC CTGGTGGTAT TACCAGTATC AGAGAGgtaa aaaacagttt  170075447
aaactaacct gactttggtc acatgacttg caaaggcaga gcttcttaat  170075497
caagctcatg ttttgtaatt agtcttctca tgcaccagct ttctgtgtcc  170075547
tttgttaaca agccccacat atatagaaac agttggaaat gttcttttag  170075597
agacaagtta caggaaaagc tttgctcccc gtaagaaatg gttacgtttt  170075647
ccttttacag acatttgtaa aaactcagag cccatttgca gctcaagtgt  170075697
agtaattgct tcaaacaaat ggcctggatt tctgtgttct ctttttctcc  170075747
atggtcttca cctcctaatc taatcaacat atactgaggc agtttttctt  170075797
attactttat ctctttttat ttcatattta tttcctataa tcagcttcaa  170075847
gtcctttgtg caacaaagtg gcatgtgttt aaataaacag tgaggagtag  170075897
gctatgtggt ttgtaggtgg gagggtaagt aggtatagat caaaaaccaa  170075947
aaactcaatg cctattgcac agggcaagca gcataaatga attctgtgag  170075997
ccaggggtga acaacaggac atcctagagg ctgtggctgc ccagagggga  170076047
cagccggtgt tcagctctag caggctgctg aagtgtctga atttgagacc  170076097
aaaattgtca gataatccca ttttccaaga caaatcagac atccagattt  170076147
gtacatggat ctctcatctt taaacatgga caactaattc caaaataatt  170076197
aagatacatt ttacaggtca aacaagacct atctttgggc cacactcaag  170076247
ccgaggatca ctattttgta acctcaaagc tagacggatg gccgggtgca  170076297
gtggctcatg tctgtaatct cagcactttg gaaggccaag gtgggcagat  170076347
cacctgaggt cagaaacttg agaccagcct ggctaacgtg gtgaaaaccc  170076397
gtttctacta aaaataaaaa aaaattagcc gggcatggtg gggcacacct  170076447
gtaatcccag ctactcagga ggctgaggca ggagaattgc ttgaacccgg  170076497
gaggtggagg ttgcagtgag ccgagatcac accattgcac tccagcttgg  170076547
gcaacaagag caaaaatcca tcttaaaaaa aaaaaaaagc tagatgggta  170076597
agtataaagt ccaaatcaga gacaccatga gggaggcact attggccagt  170076647
ccagggagga gatggtcatg gtcacggtcc tgagcctgac agaggggtca  170076697
cctcactggc gagaagaccc aaggtgtgag tcctcccact gctcacagtc  170076747
caggtctaac tggtacacaa gcacacagct tcgtaggagc atgtgtgctg  170076797
caaggctggc tacaagcgag tttgcaattt gtgcttgagg aaagcagaat  170076847
ccactgtggg gacatgtgga aaccagatat gatgaaaggg gcctggactg  170076897
gctggattct aggtccagat atgtcaccca ttgctcaacg acttaggact  170076947
cagacaaagc cagttagtga gaaggtttag aagagatctc ctatgctaga  170076997
atagcttagc attggctgga tgtgtttaac agatacagaa acccactgaa  170077047
agtacagtca tgctctgcat aatgacgttt ccatcagcaa cacaacatac  170077097
acaattgtgg tcccataaga ttataacaga gctaaaaaat tcctattgcc  170077147
cagtgacttc ttgaggttcc tgaccctgtg tgggctcagg ctaacgtgtg  170077197
tggttgtgtc ttcatttgta attttaaaaa aagggtttta aaagaaaaga  170077247
aatgaaaata aaaaattttt aaatagagaa aaagcttata aaataagaaa  170077297
ataaagaaaa atatttttgt acagctaggc agtgtgaatt ttaagctaag  170077347
cgttatcaca aaagagtcca aaagtttgaa aaaaaaccaa atagtttgta  170077397
aaataaagtt agagtaagct aaggttaatt tcttattgaa aaaaaaattt  170077447
attaatttag tatagcccta agcataaagt atgtataaag cctacctcat  170077497
```

FIG. 1.139

```
gtttagtaat atcccaggcc ttcacactca ctcaccatca ctcactgact  170077547
cacccagagc aacttccagt cctgtaactt ccattcatgg taagtgccct  170077597
aatagttgta ccatttttta tttttacac cttagtttta ttgtaccttc  170077647
tctaaattta gtatgtttgg acacacaaat acttaaaata cttaccattg  170077697
tgttacaatt gcctacagta ttcagtacaa taacacactg tacaggttta  170077747
tagcctagga gcaaaaggcc ataccataca gcctaggtgt gtagcagggc  170077797
taccccatct aggtttgcgt gagtatactc cacgatgttc acacgatgac  170077847
aaaactgcct aacaacacat ttctcagagc gtatccctgt tgttaagcga  170077897
cacatgactg aataagcaaa tgtgcagtga ttgtgcattt tttttcctga  170077947
gagagtctaa acccctcatt ccacactcag aagagtctat gatcccaaaa  170077997
cattaaggat cacttaatca aaatcatcta ctattcaatc tgagaatttc  170078047
ctgtgtagca tcctctagag ttggtgattc catctctctt tgcccctagt  170078097
gataggtatt catcactgtg tgaggcactc acagttagaa aatcacttct  170078147
taatatcaca tgcgcagggc aatggtcccc tcactccctt cacacgtaag  170078197
gttatggaac aacaggcatg agaacgctga atggcttaaa agtactttac  170078247
aaacaaaagg tgctctaatt tattcttgtt atgtcattat tgccatagta  170078297
ttacatctca agttaatttt tatctcaacc attcaaactt aagtctgact  170078347
tagtaactag ctcatcatta tttttataa caaagtaatg actagcaaca  170078397
tctggcatca gactttgaac aaacctcaga aggaactgtc aaggaggctc  170078447
cccacgggtt cacgctcttc tctcctcctg cacacaggga acagggccat  170078497
tctccttcct ttactgggac tacctgggct tcatccaggg aatccccagg  170078547
tggcaacagg agggtggtga aaaccgctgc ccgtcacctg taaagtttcc  170078597
tgtgaatgtg tctacagcgg ccagcaccac aaggcataca aagaaaggga  170078647
agggagagct gatgtgagag cggcagcgtg ggcactcctg tgaggttgcc  170078697
acagctgtag acaagttaaa tcagtgcagt tcaatcaaaa gtcatgaccc  170078747
atgagcgtca caaccagcac gagtctacaa aggaatacat taaaactaag  170078797
accagagcac agctcacatt agtgagggat gggatcattt catggagttt  170078847
ttgtttcaaa atatttcatt aacatttcac ttatatacat gtgtgtatac  170078897
tgggttgtga tttaaattac aattcttact ataaaataca gcaaaagaaa  170078947
gaagaaacaa agagagggcc actggtttac ctaacatcca caggcaggct  170078997
acttcccagc atcttgagcc ccaaagaagt aaatttcctt ccacaaccga  170079047
tgttaccaca gcctgacact tagccaatga tgaaaacgaa aaacaaaaca  170079097
aaagcttggc agtcagtatc caaatatgca gatactacag aatctgtttg  170079147
atgtagaagt tgatcctgct acccagacag caaacaactc atttattaat  170079197
aaagtccagt tcctccttaa tgaagtgggt ttaatagttg atatctcaat  170079247
aattacttag tgcatttttt atgaaggtga tgggaaacaa gtgctgtttc  170079297
ttgagtcgga aagagtctct caagctccca caaagaaatt tcccgagctt  170079347
gtgaggaatt cagtcacagg aagatcaagg aattaagtgt actgcaaaaa  170079397
acccttcatg cttctggcta agataaatct aacagtgtac tggatgtctt  170079447
caagaatacc tcatttactc aaaaaataca atattcccat tttctttatt  170079497
tgcattttaa tgtgattttt gcttcatctc ctttcttcac tcaagccacc  170079547
tgggccgtac ccagggaatt cctaaggggc aaaaggaggg atgtgaaaac  170079597
ctctgcagcc ccttcggaag tttcttgtga atatatgcac agataaacag  170079647
atgtgcattt taaaaataaa aatgctttta gatctaatgc taggagattc  170079697
aaaccaacaa ttaatttctc tgttaaaatg ggttaaaata gatgtaaaat  170079747
attaatatgt atataagcat tctgaattag acttatgtga atttttctcc  170079797
ttttctttct ttctttttga gaataagccc tttcatttac gtagaaatgc  170079847
ttcagcgttt agataattgc tacttatctt gttagctaca aacacaacca  170079897
taattaaagg ctctgtaaga attatgaatt ctggggaaat tggccacttg  170079947
tctctgtggc gtaaacagta tctaatttat aacaaatcat ctgccttagt  170079997
cccagcagga taaggtgata tgtattgccc agcacatgag aaagatggca  170080047
attaggaatt gttaccaagt tacgggagcc tcacacgaac atccatcacc  170080097
```

FIG. 1.140

```
tttggggata tgtacaagat acaaacttaa tttgatggat tccttttgta 170080147
ttgggatcaa agtctcaaaa gggaaagtga caatttcagg gaaaatctgg 170080197
tgcaatgaga ccaacactga tgagagaaat gcacacaatt taatacacct 170080247
gctcacctga tgtggcaact cagcctgtgc ttgctgtggg ttgccacagg 170080297
atgagacatg gtctgtgcat attcccagca gccacccatc tcatcactat 170080347
tcttgccagc ccagatttac agttgttcaa tagatggatt tggtaatatc 170080397
tgcatgacaa caacaggcag agaaggttag atggcaattg attcttgatt 170080447
ggtgtaagtt tatagaacac attctggcag ggcccaaagg aaatcactca 170080497
cctacccctc tgtgatggta aaacgttgaa aattccacgg acttggacct 170080547
tgtgatcctt cagtggaaga tgggcagatt ccttgcttta attgacagac 170080597
actttctaaa taactaatgc aatcttatat tacattatag tccataaggg 170080647
agacatactt aaactactac ttacaacaac tgtttttaga gcctttcaaa 170080697
tggtttgtac aaagtagctc ccatttaaga tattttccta gtatttaagg 170080747
ctatctagta gacattacaa aacaatacgc tgtaaataca ttcagatttt 170080797
tatcagtaat acttaacatg ccgtaatttg aactttctgc taaatcatgc 170080847
tatccattcc tagttggccc caatggtgag agtttactgt ttctttaaat 170080897
aattttgttt ccctttgctg tctagaggtg tttatcattc tgcttacttg 170080947
cctgtgtctc tggaatattc agaaggttcc atgggaaaca atttgaatat 170080997
gcaaagaagt tatttttaaa gcaaggaaaa tgtttcata tggatttatt 170081047
ttgagcactt ctgcctttgc ctccactggg aacatgtttc tctccaacgc 170081097
cgaagccccc tccctgtgtg gtgtttgacg cagaggctga cagggcaggg 170081147
aagtggggtt caagatagga aggccattgg cagtgtgacc ccagccccaca 170081197
gtcctagatc ccaggtcgtg acaccactct tttgacagcc cagattgtta 170081247
cctaacaaga atgactccca agctcaacca ttccaatgcc atctcctctg 170081297
gttccAGATA AGATTGAAGA TGAGCTGGAG ATGACCATGG TTTGCCATCG 170081347
GCCCGAGGGA CTGGAGCAGC TCGAGGCCCA GACCAACTTC ACCAAGAGGG 170081397
AGCTGCAGGT CCTTTATCGA GGCTTCAAAA ATgtaagacc cgtgcacgct 170081447
ctgaaggcct ggggggggtt cccacgtgag gctacactct ccccaatgcc 170081497
aagggagctc ataaggcgtt tcccatatgt gaggctgtac aaggaaggcc 170081547
agctctataa agggggcatg agagggagat cacctggcta gaaaggaagg 170081597
ctccaggcga ggatggagca acctcaggag acagtaaacg gccaactgcc 170081647
cagaaatttc acagggtggc acatcctcaa ggaattcacc ctggcccagg 170081697
gtcaagcctt agcccttaac ataatcatac cttccaacct ggtggtgccc 170081747
ccacaataat gggatttggc cctgctgact tatgctaacc aggctcaccg 170081797
agactgatgt gtaagccgaa tgtcggtgta ttaatttacc ttgggaaatg 170081847
gaactgacag tggaaacaga cactcctctc ccttcgctgg gacccgctct 170081897
ccttggaagc cacatggaag ccaggttaca atcaaaagtg gagtcagagg 170081947
acgggagttc cttgtttagt tgttacttta aatacattaa tgtgttcctg 170081997
cagtctcagg ccagtttgag agctctcaga tacaatcctg gatattaatt 170082047
tattttttaa gtttaactct cagagtgcaa tcttattccc aaatcctgga 170082097
gtggtgtgga gtggggtggg ctacagcgac atgcacctgg tcaccctccc 170082147
tccaggtgca gtctgtaggt agagctgagc tgggtcagtt ccaaactgac 170082197
cacagcctca atgttctcca aactgctgac ccacagggat tccagcccct 170082247
cctgggagtt atctgacagg tgctgggatg cctcttcctt ccacactagc 170082297
cttgactgca catgccaagt gcccagtttc ctaccattag ggcttctttc 170082347
cttcgatggc agcattagca gtgggcagcc gagttggaga aggatcctgt 170082397
gggaaagttt tccaggcagg cactgggctc agagggaaca gcatccagaa 170082447
aagagaagaa atctacactg cttggcatct accatggact caataccacc 170082497
taacataggt tcataagata cccttgggga agttattgtt acccccattt 170082547
tacaggtaag gatattgagg atcagagact ggcttggcca aagtcacaaa 170082597
gcttagtatt ggctgagcca ggatttaaac ccaggttttt ctgatcttaa 170082647
agccccaaat ctctccacct cacagtgccc attctctgac aatgtctcat 170082697
```

FIG. 1.141

```
cattttgcaa agcagctcca gtcctgagat ggcactactt gggagaagtg   170082747
gaaatgcaca ggtccctgtc cctggggatc atgaggaacc ccagacacca   170082797
aggctgggcc cagtcttctc ctagtgctgg ccctcaaatg cctcccgctg   170082847
actctctccc cttcccacag GAGTGCCCCA GTGGTGTGGT CAACGAAGAC   170082897
ACATTCAAGC AGATCTATGC TCAGTTTTTC CCTCATGGAG gtgagtctga   170082947
ccttgaaatc tatcttgccc agctccctct ctggtaagca gccttcccctt  170082997
cctccaagtc ctctcttcct tgccatttgc ttccttctcg aggaagagac   170083047
aaactcaggg caggacacct ccctcatcgt gagaggtggg agtctccaaa   170083097
gctttagcag gaaagaactc tgaaaatgaa cccaccctgg aaggggaaga   170083147
agggctgata atgcaacatc acaacgtctc agaacagctc tagaaagcag   170083197
gtattataat cccagatgga gtaactgagt ttcggggaag ataagcagtg   170083247
tactcaagat tgcacagctg gtgagtagca aaccaggatt agattccata   170083297
agggtctgaa acaggttttg ccatgctggc accaccattg tgcagggcac   170083347
ttttgaatct tttccttaaa atagctgaga caagctggaa ttttgtaaaa   170083397
gaacttcagt aaataccgaa gactataaaa ataaactaat tgaaaaagag   170083447
gcaggaaaca taaagttgtg cttattaagc cagtttacaa gtgtgccagg   170083497
cccacaacag ctgctctgtt gccctgcccg actcctgtgg gaaccagctg   170083547
tgtccccatg ggcctgggac cacatcggtg actcctcctg tggcctccat   170083597
gtgtcacatg ccactttgca tcctgtcacc aagagctgtc tcctgcaaga   170083647
catcttccct ggatcctgac aaaatgcaaa tccaagtatt ccaaacactt   170083697
cttgggccct gtttctcatg ggcctttttg gcagcagaca gatgccttcc   170083747
ttggtgtgtg gggcccctac ccagatcagg tgggggaggc agttttgtcc   170083797
catgcaggcc ccagaattgc agtttgctga gttccactga gccactgttt   170083847
attgagttct cactgtatgc caggcacagc tgtagtttaa aatacttttt   170083897
aaaaaatttc aagagatagg tcttgctaca tcccattgta gagaggtagg   170083947
aaagggaagc tcagagaggt cgtgcttgat gcccacagtc acatagctta   170083997
tgtagtacag cggcatccaa gttcaggtct ctctactctg gagtgagtgc   170084047
tcatcccagg cattcatggc cgttcagaag aacattgtca tgcagtcact   170084097
gtgccattca tacaccaacg actccatgca tagacaggca ggagaatggt   170084147
tttctcatga tggctagagg gaggggcaag ggctcatctc actttttgct   170084197
agatctaact tcacacccaa acccaaagag ttgagtcaat gggcccccact  170084247
ccataatttt ctcctttcca tcaccctagc atcactctcc tctctttctt   170084297
gtcgaagccc tgccttgttt ggaaggttct ccctgtgtgg aattcctgcc   170084347
cccatcacct gccctccttt tctgccttgt agATGCCAGC ACGTATGCCC   170084397
ATTACCTCTT CAATGCCTTC GACACCACTC AGACAGGCTC CGTGAAGTTC   170084447
GAGgtacgct catctggggt ccactctagg ggtcctctgg ttctgcatca   170084497
cctcccccctc taaatctcaa ggcattgggg gaaggtctgg accatcaaaa  170084547
gctctcagtc agaccaaaga catgtttatc catttgtaag catttcctaa   170084597
agatggggaa aagcagcagc aactttccct ggcctgcagg aactcaggga   170084647
ctcaggggac taataacaac agtgtatgag cttccgggca cactgcttcc   170084697
cagtggcagc ccctgtactt agggctttgt atgtattaat tcatttactc   170084747
caattcccac aataacccta tagggtaggg ttttattatt gattaccttt   170084797
ttacagaaga ggagagtaag gcaaagagag atagagtagt tttcccaagg   170084847
tcaaagagca cataaatgat aaaggatgga tttgaatgta ggcagaatga   170084897
ccctcaatac agactgttcc tacagtccac gtcctcagcc actagaccat   170084947
acggccactg ggatgataga cagaccactg cagccatgga taaggcaaaa   170084997
acagggctgg ctgtgttgat ctgtgtctct cagagctcca ttcttcctca   170085047
agggggcacc ttgcaaaaaa aaacaaaaaa atggggcagg gtagggaact   170085097
gaaggcagga gctcttcaca gagcatagcc acatcctcca ggcagacaag   170085147
aggacgcagg aggcaccatt ctgtgagagt atcacagtct gacccaaaga   170085197
cacagcttca cactgtctga tggcttgatg gttaatgtca ctctgccttt   170085247
tccccttctc agGACTTTGT AACCGCTCTG TCGATTTTAT TGAGAGGAAC   170085297
```

FIG. 1.142

```
TGTCCACGAG AAACTAAGGT GGACATTTAA TTTGTATGAC ATCAACAAGG  170085347
ACGGATACAT AAACAAAGAG gtaagtgagc tggggccagg ggtgtgagag  170085397
ggctccagtg aaggtaacta acccaacaga aaacagcccc aggcatgagg  170085447
atagcactgt ctgaatgagg caggctctgc tttggggcta acagagctgg  170085497
tccctggcaa aataaagaag gcctccctca ttgccctacc ctgccctgtt  170085547
cccaagcgcc cagaaaggat taaacagatt cattctcact gggtcaccta  170085597
gattcagtag atattacaca gtggataaaa atgacttgtt tcagtgtgaa  170085647
gagttactct tccctaggga acctgcattt gggaaggtta ggagccacaa  170085697
gtcaaagcta aaagttgaaa tggtggaatt gtaggcagca cctagaatag  170085747
aaaagaaaga tttttaagga agaggaacct acaattgggt catattggcc  170085797
ttaaactatt ttgcctatta atacaaccgc caagggggta atggaaggta  170085847
cagctgtctt tacagaaatt atcacaaata atttctgaat cttcactgct  170085897
ttgcactttt agaacctcag aggacatgtc tctagccagt gaaataccct  170085947
caggtctatc tcaaaactca ctttggtatc cactgtatcc tggtatctca  170085997
gtggaagctg gaaattggca tcctgtaaca ctccacttgc tgagctcctg  170086047
tgtgccaggc acggtgcctg gaggtataga tatcagcacc aatcttcacc  170086097
tcaacccggc aagcttctct ctgtaagctc agagagttta tccaactttc  170086147
attcctcatt catttagtca tgtttttaat taacacagat ttgaaggctt  170086197
attaggtgtt ctaggtgctg gaggtaaaga ggtgaacaat cagactaggc  170086247
cccacactgg agcagcatag agagatggac aataaacagg ccaaaaagga  170086297
atcagcaggt agaagatatt ttggcaggga aggttagcaa aggcctctcc  170086347
aaggaggtgt cgtcatactg gaaccagtta tacaaaaagc caggaaaagt  170086397
gttccaggca gaaggaacag ccactagaga ggctttgagg caagatagag  170086447
cttcatgtgt ttcaaaaaca gaaaggcttc agatggctgc agatgaaggt  170086497
atgaagctga agactagtgc aggatgagcc tgacaggtca gcagagtcag  170086547
atggtggagg gctagggtaa ggggcccatc catattcccc tgggaagctc  170086597
ttagatgaac atgtttttttg aaagacacaa aaggcaaaaa cagacttaaa  170086647
aagaatcaga aaatctgact agctctgtat tatttagaga aattatattc  170086697
acagttaaaa accattccca aataaaatta taggcccaga tggtggactg  170086747
gtgaattcta atatcaatcc tacaaaaaaa ttttagaaaa tagaggagga  170086797
tggaacattt cccagcttgt tttataagtc caatagtacc ctgataccca  170086847
aaccaaagaa aaaaaggtct tatgaaagga aacaactaca aaacagtctc  170086897
cctcgtgagc acagataaaa aagctttcac taaatattag caaattgaat  170086947
tcagcaatat ataaaaagga tgatacaata caactatgtg agttttattc  170086997
taggaaggca aggttggttt aacattcaaa aaccaatcaa tataattcac  170087047
tatatttaaa gaaaccaaag ggatatagac tggaaaggaa gaattaacac  170087097
tgtctttatt tgtacatggt ataattgtat taatagaaaa ccctaagagt  170087147
ctacaaataa actgctaaaa ataataagtg aatttaacaa agtgaagaca  170087197
tgagttctat ttacaaaaat catttataat tctacatcca acaagcaacc  170087247
agaaaattaa attaagaaaa atagcatcaa aaagcacaaa atactttgag  170087297
aaaaattcaa caaaacaggt gcaagactca tacactgaaa actataaaat  170087347
attgctgaaa taaagtaaag aactaaataa acacagagat aaatcatgct  170087397
catgggttgg aaggcccaat atagttaaga tgtggattct ccaaatttga  170087447
tttatagatt tagtgtgatc tcaatcaaaa tcccagcagg tattttgtag  170087497
cagttgatat gggaatgcaa aaaacctaaa ataaccaaaa catctgaaaa  170087547
agaacaaagt tgaaggacta aacctacctt acttcaagac ttaatgaaaa  170087597
tgtgcagtag tcaagatggt agggaattgg cataaggata gacatataga  170087647
tcaatggatc aaaatagaga gtcaaaaaaa ctaaaagtag agctaccata  170087697
tgatccaaca atcccactgc tggctatata ccccatgtaa aggaaaccag  170087747
tatatcaaag agatatctgc actcccatgt tttttgcaga tctgttcata  170087797
atagccaaga tttggaagca acctaagtgt ccatcaacag atgaatggat  170087847
aaagaaaatc tggtacttat acacaatgga gtacttctgc cataaaatag  170087897
```

FIG. 1.143

aatgagattt aatcatctac aacgtggatg gaattggagg tcattacatt 170087947
aagtgaaatg aaccaggcac agaaagacaa acatcccatg ttctctctta 170087997
tttgttggat ctaaaaatca aaacaatatg aagatagagg gcagaaggac 170088047
ggttaccaga ggctgggaag gatagtaggg gggctgtggg ggaagttagg 170088097
atagtcaatg ggtacaaaaa aaatagaatg aatgaataag gcctggtatt 170088147
tggtagcaca acaaggtgac tgtagtcaat aatttaattg aacattttaa 170088197
ctaaaagagt gtaattggtt tgtttgtaac acaaaggata aatgcttgaa 170088247
gggatggata cccatttttc atgatgtggt tattacacat tgtatgcctg 170088297
tatcaaaact tgtcatgtac cccataaata tatacaccta ctatgtgccc 170088347
acaaaaatta aaaataaaaa ataaatattt tttaaaaata gagatagacc 170088397
cacccatatg tcaatgcaac agatgccaaa aagatcaaag gggaaagaac 170088447
cgtgttttca cagctgtata tccatttgga aacaaaaatg gacattaacc 170088497
ttaacctcat gccaaacata aacatcaact tggaatggat tatagactta 170088547
aatattaaaa caaaagctgt tttcttaagg aatacatagg agaaacattc 170088597
ttacaacttt ggagtaggaa aggataagga atcatttctt aaagtagata 170088647
aatttgactt tatcaaagtt aaaaattttg tgctttagaa gacaccttta 170088697
agaaaatgga aatgcaagcc atggacttgg aaaaaatgtt tgcaaattat 170088747
ataccagata tataaagata ccaggatacc aaaccaatat aaagactggc 170088797
atccaaaata tataagggac atttataatt taatacaaag ataaacaact 170088847
tcatataaaa taggcaaaag atttgatgag atatttaaga aaagaagata 170088897
tatgaatggc cagtaaaccc atgaaaggtt gctctatatc actggtcttc 170088947
aaagaaatgc aaattataac tataatgaaa tacaattgca cagaatggcc 170088997
acaattaaaa agactgataa taccaagcat tggcaaagat gtggagcaat 170089047
agaaactctc atagatagct ggcagaaatg taaatggtac aaacacgttg 170089097
ggaaacattt tggcatcttt gataaagctc agcacacact taacatacaa 170089147
cccagaaatc ccattccagt caggcatggt ggcttacgcc tataatccca 170089197
gtactttggg aggctgaggc aggcggatca cttgagctca ggtgttcaag 170089247
accagactgg gcaacatggc gagacactgt ctctactaaa aatacaaaaa 170089297
aaaaaaaaaa aaaagccaga catggtggta agcacctgtg gtcccagcta 170089347
ctagggaggc tgaggtggga gaattgctta accctgggga gtggaggttg 170089397
cagtgagctg agattgcacc actgcactcc agcctgggtg acagagcaag 170089447
accctgtctc aaaaaaagaa aaaaagaaga agaaaagaag tcccactcct 170089497
ggatatttac ccccaaaaga aaaatatgta attccataaa gacttgtaca 170089547
aagatgttca tagcagcttt attcatagta atctcaaaac ttaaatgacc 170089597
caaatgtctg tcaacaggac aatgggtaaa tacatcatag tctgttcatc 170089647
caatggaata ttactcagca gtaaaaagga atgttatagt tgcatgcagc 170089697
aatgtgtatg aagctcataa acctcatgct gagtaaatga agccagacgc 170089747
aaatgagttt acactgtttt actccattta catgagattt tagaaaatac 170089797
aaactaatct atagtaacag aaattagatc tgtggttgcc tggtgtcaaa 170089847
gcttgagagg cactcactgc gaagaagtgt gaagggatgt cttttggttg 170089897
tgaaaatgtt ctatatcttg agtgtggtgg aggttacatg ggtggataca 170089947
tttgtcaaca ttcatcaaac agtacactta aaatgggtga atttgttata 170089997
agtaaattat gctccaataa atttgattta tttgttgaaa aacttggtgt 170090047
aaggggggaag tgcctaacca atagaagaca ctcaaaaaat gtgttgaagg 170090097
aaaaaaatcc tgtgaaataa agcaggtaag agaaaataag aactcaatat 170090147
catccaaaat atagattaca aatcctaaat gagataatag gaaattaatc 170090197
ccagtgctct gtttaaaggc tcatacctgt aatcccaaca ctttgggaga 170090247
ctgaggcagg aggatgggtt gagcccagga gttcaagacc agcctggtca 170090297
acatagggag agcctgtctc ttcaaaacaa aaatttaaaa attacctggg 170090347
tgtagtggca cgtgcctgtg ctcccagcta ctccagaggc tgaggcagga 170090397
ggatagcttg agcccaggag ttcaagcctg ccctgagcca taatcactgc 170090447
accacactcc agcctgggca acagaacaag acccttcctc aaaaaagcaa 170090497

FIG. 1.144

taaaataaaa taaagaaatg cacatgacta acatagggtt tattccagga 170090547
atgcaggaat agcccagtag cagagaaagc ctattaaata atttatcaca 170090597
ttaatatatc aaaagatcaa accatttgat gctaaaatca catttgatat 170090647
aatttaccat ttattcataa taattttcag gattcaatta attaggaata 170090697
aaatacttct tcagcataat agaaaatacc ccagcctggt acacagcttc 170090747
atactttatg gtaacacgcg gagattctca ctgaagaaaa gatgaggcaa 170090797
gaaaagatga tgaagaaaag atgaggcaag aaaagatgat gtctgcacac 170090847
tgtcagacat caccactgtt taacatttcc tgaaagctct tcaaacacag 170090897
tgaaacagaa aaggaaatgc gatctaaata ggaaaaatta caacattcct 170090947
tgttaatgac atgattttct atctgagaaa aaagacagca agaaaatcaa 170090997
cttaaaacaa ctagaacttt taaaaagctg gcaaagtgac tggtaataaa 170091047
atacatatgc aaaaagaaat tgtgtagcca atatatcagt tgtgactagc 170091097
tagaaaattg taatacaaat attctcattg tgatcacaat aaaatttaaa 170091147
gcacatgggc atttttaaat atccataatt tagatgaaga gaaagaaaat 170091197
tttgataagt agagaaacat accatcttct gaaaggatgt atattataaa 170091247
gatagcaata ttataatgac agcaattctt ctctaattaa atttatttta 170091297
ttttgaatca aaatggaagt gttatttggg aaggaaattt ggcacaattg 170091347
ttataaagtt acattggaag attaatcaga tgaaaatagc aaagataatt 170091397
ttcaaaaaga agaaaaatgg tgggatttgt tctaccagat actgaaatat 170091447
attataaagc tgaaactatt aaaatattat aatatcagag aaggaacagg 170091497
tagatcaatg gaacaaaata gaaatcccag gtacaaatac catcttggtt 170091547
cataataaag ggagcatatt gaatagagag gtaatgaatc attaaatgat 170091597
tcttggaaaa ctggttaact attttggcaa taagtaagta aatattctta 170091647
ctcggtacca taaacacaaa atcactatag atatgtacag ttgcttttta 170091697
actaaaaaag aactaaaaat catatgtgaa tatctgatca aagaatggaa 170091747
aaagcataaa atcaaagtta gaaacaattt tttaaattat tgatggcttt 170091797
acactgtaaa tattttaaaa ttctgcatat caaaaaatac cataaacaaa 170091847
gttgaaaagt aagtgacaaa cttgttttta aaaatctgca atttatgatg 170091897
acagaaagga ttgatattcc tcagtagaca ttcatcttaa caaaggcaag 170091947
agtcatattc atcgtgctta tctttgtatt tctttgacac aatatctagc 170091997
acatggtaga tgcgtaaaaa tacctttaaa taaattaaaa atctattaag 170092047
atattttaac aatttaataa atctacacga atatataaag agctctcaca 170092097
atccagtcag aaataggtga acacaatgag caaagcagat gaaaaaatag 170092147
ttcatgggaa aataaataaa aatagtcaat acatatatta gagacctcac 170092197
taagaaagta atgtatatct ttaaaaacaa tgaattatca cttatctatt 170092247
aaattgcaaa ggttttgtaa agtctttgtt gaaggttggt ggaaagtggt 170092297
ttttcataca tagttgctga aagtgttctg ataataaact ttctaaaagg 170092347
tatttgagga atatgtatca aaagcattga aagttatgca tcccattctc 170092397
cttataaaac cacaccttgg tatatgtccc aaggaaataa agaatagaca 170092447
caaagactta aaagcaagaa gagtcttcag gtaatagtgc cccagaatgt 170092497
gatagccatg atatccacta acagcagatt tgtaaaatga attacagtaa 170092547
atacatataa tggaatagcc agtggccact taaaatcatg aaagagtaat 170092597
ataaaataaa cattagtatg atatattaaa tttttaaata tattacattt 170092647
taaattgata aagtggtatg tatgatatct caattttata aacaactaaa 170092697
tgcttatata cacatgcaaa tatatgatac tctaaaatat tcaaatacta 170092747
ccttgcaaaa catataaaga aaaaaataca gaaataggat ttagttggtc 170092797
ttcaactttg gttcactcat tattccatca ctgaataaac ttactagtgc 170092847
ctactccctt tttgtaattt gcaaactagg cagaattctc cccattaatc 170092897
tatcagacct ctctggaggg cagagttaat aaagtacccc ttaaaagaaa 170092947
aagaaagtgt ggataagtag cttctcagaa aagatagcag gatcttcccc 170092997
tggcaatcat ttggagataa cctcatccaa gttgtaggct atgaaaatcc 170093047
tgagagagca acaaaattgc tctttctgtg attaaaaaaa aatatcagac 170093097

FIG. 1.145

```
aggaaaagca tcaatggcca tgtagatgtg aagggcttgt aaagcacaca 170093147
tttaaaaata aacacatgga tagagacatc tatttcctcg ttctatctgt 170093197
tgagggcacc tcagagcaat gacatccctg tagcagtgag catactagta 170093247
cctagacttt gatttctaaa taccattctt cgataaacag aaccagtctt 170093297
cttgaagaat agttgattct aagattggga aagagaaaat acaagatgag 170093347
cctggagtac tttattatgc tgaaggtata aaagtgctta aaaaaaaaaa 170093397
actgcaggag tcaacctgaa ggagttccca atagtcagaa tgaaagcaat 170093447
ttgagcaaaa ttaaaaatta ttaagtactg gattataacc tgtaaaatat 170093497
ggtaaatgcc cacaagtcca tgctaatgta aataaacaac tgaatacata 170093547
aataaatgca ggagagaagg tagctcttcc ttacagaaga attgtaatta 170093597
ataagtatag aaggaataaa ggaaatacaa aattaccatc aggcaaacac 170093647
tacagtaata atttttgcag gcaagatcca ctgaaagata ctaaatcagt 170093697
aaggaaactt gacagacacc accttaatca agtgatcaag gttaacatta 170093747
tcagtaataa gacatctcaa cactatgtaa ctccctgata tgacgcactg 170093797
agaaggttat accatcactt ctgtggtatt cttgccagaa atgcataact 170093847
tcaatctaat cataactaaa ccagggatta actcaaattg agagacattc 170093897
tacaaaacaa ctgacctgta ctcatatcaa aagtgtgagg tcctgaaaga 170093947
caaggaaaca aagaaactca ggctgggcat ggtggctcat gcctataatc 170093997
ccagcacttt gggaggcaga ggcaggaaga tcacttgagt ccaagagttt 170094047
gagaccagcc tgggcaacat ggcaaaaccc catctctaca aaaaattagc 170094097
caggtgtggt ggcacttgcc tgtagtccca gctacttgag aggctgaggc 170094147
gggaggatca cttgaacccg ggaggtcgag gctgcagtga cggggattgt 170094197
gccactgcac tccagcctgg gtgacagagc aagaacctgt ctcaaaaaaa 170094247
aaaaaaaaga aaaaagaaaa aaagaatgag aaactcatac agattagaag 170094297
agactaagga gacacaacaa ataaatgcaa tgtagaatca ttgaagggaa 170094347
aaaaatatta gttgaaaagc tgagatcccg ccactgcact ccagcctggg 170094397
ccacagagcg agactccgtc tcaaaaaaaa aaaaaaaaaa aaaaaaaaaa 170094447
aagaaaagct gataaaattt gaataagccc tgtagtttag ttaataatag 170094497
tgaagccatg ttaatttcct gggtttggtc attgtgctct ggttatgcaa 170094547
gttgttaaca ttagaggaga ctgagtgaaa ggtatgcatg aactctctgt 170094597
actaattttg taaattttct gtaagtctaa aattattcat aatatgcaaa 170094647
aattaaacaa aaaataaaat aaaataagca catggaatga gactgtcccc 170094697
tgggtctctg tagaaaccag gtcaaacatc ccaaatgctc ttttaccccc 170094747
attctgagtt gggccagaat ggtcagaata atggttccca atgtaccttg 170094797
ataaacacgg aaactctcag gaccgagtcc taaggttctc tgattcaata 170094847
ggtttggagt ggacttgaga actgatcttt ttaataaggg cctcagtctg 170094897
tggaactatt ggcctcatgt gccctgtgga taatcttggc tgttggttca 170094947
tttttcttaa ctgaaaacag tggcagaaac tatggggatt tttaaatctc 170094997
taggctagaa cattaacttt ttaaaaattc agaatagtat tttatttgcc 170095047
tcaagcctgt gaatggggat cccacaaatc accccccact gaagacaatg 170095097
cccataacaa ggtaacctac ccatgagctt ctgagggatt taggaattgt 170095147
ctaccatctc ctctctaaga agggctccca caatatatcc ccttctgctt 170095197
gcttctaact ccctatcacc tgctaaagaa ggacctcacc ttttaatcac 170095247
tttcattgcc aaggggcaca aggagcccca aactctgtca cctaggaaga 170095297
gcttgacctc atggtttcca cactgtgtgc ttttatgtcc ctgctccagG 170095347
AGATGATGGA CATTGTCAAA GCCATCTATG ACATGATGGG GAAATACACA 170095397
TATCCTGTGC TCAAAGAGGA CACTCCAAGG CAGCATGTGG ACGTCTTCTT 170095447
CCAGgtaagt gcacacaccc tgcacatgag ctgtaagccc agcctagatc 170095497
aagtcaaccc acgagcatct gagcaaatga tttgtgtcca accctgtact 170095547
aagcatggtt ggtaacagaa aagaattata agatacattg tcctcaagaa 170095597
acagatgatc tccttaagct gcaagtgtac atgacagaag agaacaagaa 170095647
agtatattat taaacgctag tggtatagta tgaactctaa atccataaaa 170095697
```

FIG. 1.146

```
atttggggat cagggtaaac acgaaagact tcattaatta caactgtgga  170095747
ggtgttaagc atttgtgtct gggaagtaag gggaaataag attggaaact  170095797
aggatagggc cagattatga gacctttaaa tggaagagtt tggccttgct  170095847
ctggtacagg atgggcagct agtgctgatc cttgactaag ggagtggtat  170095897
aatcattggg gcatttttagg aaaaaattaa tctagcggtg gagtatcaga  170095947
gaatatcaag agttcactct agttcaacct cccactttgc agatgggaaa  170095997
agagagtcct ctctggcctt gtgcaagttt gtacagcaag taacaggcca  170096047
gaatcagaac ctcttttgcc cagtgttctg ccagatggac agggtagcag  170096097
ggagtctaca gaagaagcag aataagccag cagtgaggtg atgagtgtcc  170096147
agagcaagtc ttttgattta aggaagctca tggggctcaa agtgttgtaa  170096197
tcaggaccta attggagttg tctggccagt gaaagacaac tctcattctc  170096247
agggcaaagt tggttaatga aatgaatgaa atgagctcca gctcgttact  170096297
ctgagctcca gcaagaaagc aggggagtaa gctttggaat ggagatcacc  170096347
agattctgta aagtgctttc tgttatgtct ttcagAAAAT GGACAAAAAT  170096397
AAAGATGGCA TCGTAACTTT AGATGAATTT CTTGAATCAT GTCAGGAGgt  170096447
aaggagagat ctcagggcac aataactcta catctgggaa aggaaacctg  170096497
gggcctgggg acctgcagaa ggaaggtgat gagaaacctg cacatacctg  170096547
caacccctcc catcagagcc aacaacacca gcaacaactg tgaagtccac  170096597
agttccactc ctcaacctga cctgcagttg gtcttggcta agcacaagac  170096647
tgaacagaga gcctaagtag ggtctgggg gcatgtgaaa actcagaggg  170096697
ggtctctgtg aaaatagact tcccgagagg gcaacaccat tattttttag  170096747
cctgcctctg gcttgatgac ccatttccca gactacaagg aagcagctgg  170096797
ggggaaaaaa acctacaatt gtgtgattct caaaccacag tgtgcataaa  170096847
aattgcctgg aatgattctg aaaatgcata tttccaggcc tcaatcccag  170096897
agactctaga tctgggtcac tttaacacaa atgtcctgga ccaatgcttc  170096947
taacacttta atgtgtgaaa caatatcctt gatgattttg ttaaaatgca  170096997
gattctaatt ccataggtct ggggtagggc ctgagatgtt actttctca  170097047
cattctcccc agtcacactg gtgatgctga tcctgggaac acaactttca  170097097
ttaagtctaa ccaatagacc agccccagag tccaccagag actgaactgg  170097147
aaataattgc ttcatctact tttgagaaat ccatttgtac ccccacatta  170097197
ttttagaaat gttcagagtt actctgagct ccagccaaga agaatagcaa  170097247
atgtaagaaa gccggggaga agttcctagc agatactgag cccccatcaa  170097297
gtttcaagca catacataaa catcacagcc accctgttat gtagatgtcc  170097347
tatgtgcagg gtgatatcca agatatttaa caactagaat ggaatgaaca  170097397
ctgacccccт tgggggtgag ttctcactgt taattccctt gagagctggt  170097447
tgtaaaacag cctggcacct tcccccacctc caaccttgat tcctctccca  170097497
ccatgggatc tctgcacacc cagcttccct tcacattcca ctgtgagtgg  170097547
aagcagcctg aaaccctcac cagatgcaga tgcccagctg aactttccag  170097597
ctgccagaat aatgagccaa ataagcctat actgacatta accttttcat  170097647
ttctgatatt gataatttga aaagcagtct taataagcat ttatctactt  170097697
tattgatttt tttgaaagag agcgctttgg ggggttttct tactgtatgt  170097747
ctctattgca tgttctgtat tttacatttt tctattattt cttctctgag  170097797
gtatagtatt gaatgtagaa aaatcctcaa atgttcggta ttaagcaata  170097847
cacttctaat tcatggttca gagaagaaaa tatctcgaat aaaaataaaa  170097897
taaaaatatg acttatcaaa atttgtagga tctaaagcag tattccagga  170097947
atgcaaggtt ggtttaacat tcaataattg gtcagtgtaa ttaatcacat  170097997
taatagaata aaaagagaaa aaatataatc atttcagtgg atgtaattgt  170098047
tcagagcttc ttaaaagaag caactcacta ttttactaga tgatttgttt  170098097
cttctgaatt cctctttaag gctacaggtg gtgcttctta ctttgaactg  170098147
atcactttct aggtccccac ccttacttct tgtttttcat accottgtag  170098197
agtttctcc atataggaaa cccatgcttg acatttgctc accagagtta  170098247
cagagctctc agggaggaga ctcagagttc taaccctctt gccctccttt  170098297
```

FIG. 1.147

```
tttcccagGA CGACAACATC ATGAGGTCTC TCCAGCTGTT TCAAAATGTC  170098347
ATGTAAactgg tgacactcag ccattcagct ctcagagaca ttgtactaaa  170098397
caaccacctt aacaccctga tctgcccttg ttctgatttt acacaccaac  170098447
tcttgg
```

FIG. 1.148

Amino acid sequence of KChIP1

MGAVMGTFSSLQTKQRRPSKDKIEDELEMTMVCHRPEGLEQLE
AQTNFTKRELQVLYRGFKNECPSGVVNEDTFKQIYAQFFPHGDASTYA
HYLFNAFDTTQTGSVKFEDFVTALSILLRGTVHEKLRWTFNLYDINKD
GYINKEEMMDIVKAIYDMMGKYTYPVLKEDTPRQHVDVFFQKMDKN
KDGIVTLDEFLESCQEDDNIMRSLQLFQNVM (SEQ ID NO: 2)

FIG. 2

Nucleic acid sequence encoding the amino acid sequence of KChIP1

ATGGGGGCCGTCATGGGCACCTTCTCATCTCTGCAAACCAAA
CAAAGGCGACCCTCGAAAGATAAGATTGAAGATGAGCTGGA
GATGACCATGGTTTGCCATCGGCCCGAGGGACTGGAGCAGC
TCGAGGCCCAGACCAACTTCACCAAGAGGGAGCTGCAGGTC
CTTTATCGAGGCTTCAAAAATGAGTGCCCCAGTGGTGTGGTC
AACGAAGACACATTCAAGCAGATCTATGCTCAGTTTTTCCCT
CATGGAGATGCCAGCACGTATGCCCATTACCTCTTCAATGCC
TTCGACACCACTCAGACAGGCTCCGTGAAGTTCGAGGACTTT
GTAACCGCTCTGTCGATTTTATTGAGAGGAACTGTCCACGAG
AAACTAAGGTGGACATTTAATTTGTATGACATCAACAAGGA
CGGATACATAAACAAAGAGGAGATGATGGACATTGTCAAAG
CCATCTATGACATGATGGGAAATACACATATCCTGTGCTCA
AAGAGGACACTCCAAGGCAGCATGTGGACGTCTTCTTCCAG
AAAATGGACAAAAATAAAGATGGCATCGTAACTTTAGATGA
ATTTCTTGAATCATGTCAGGAGGACGACAACATCATGAGGT
CTCTCCAGCTGTTTCAAAATGTCATG
(SEQ ID NO:3)

FIG. 3

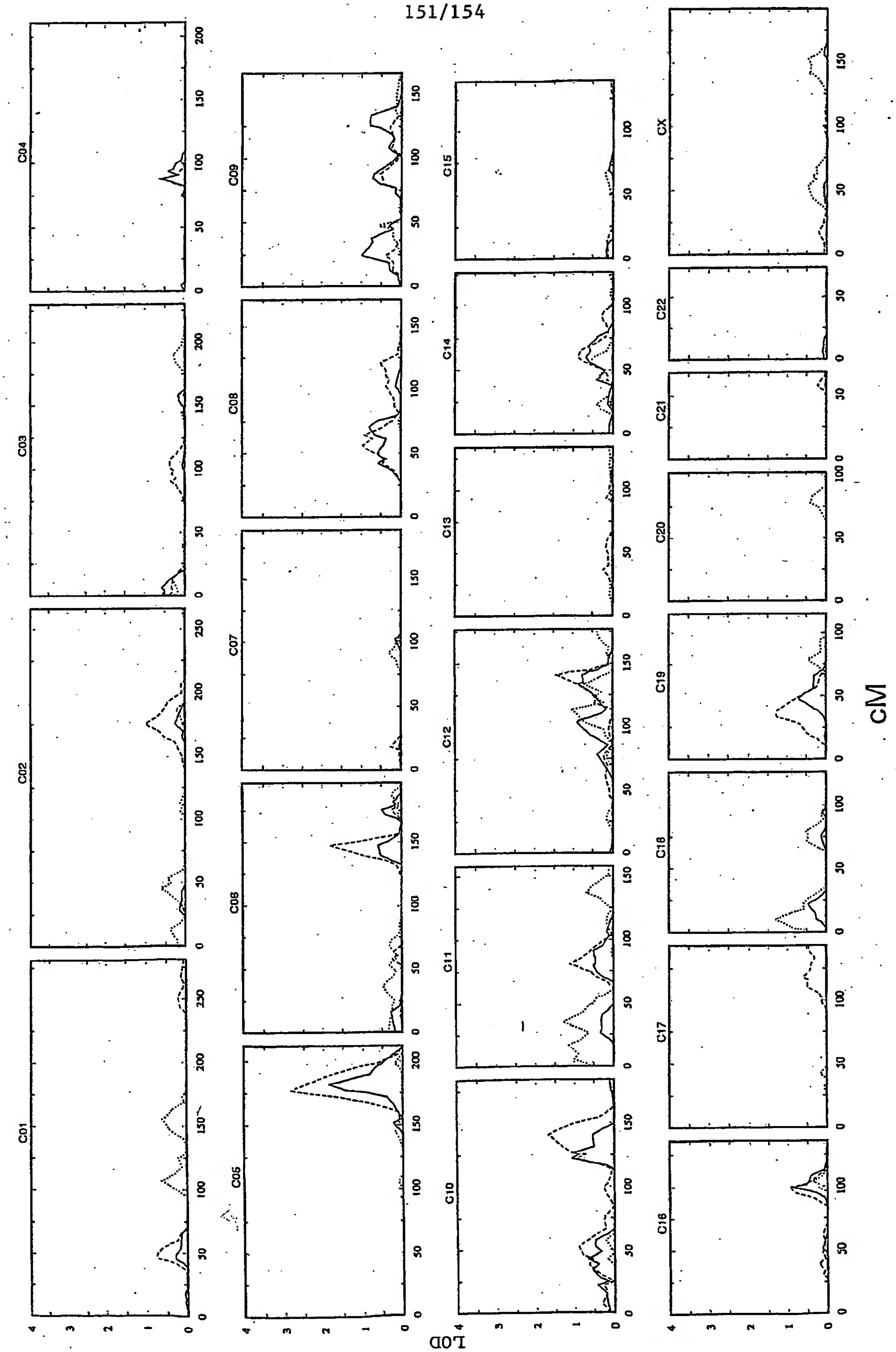
C01
C02
C03
C04
C05
C06
C07
C08
C09
C10
C11
C12
C13
C14
C15
C16
C17
C18
C19
C20
C21
C22
CX
LOD
cM

FIG. 4

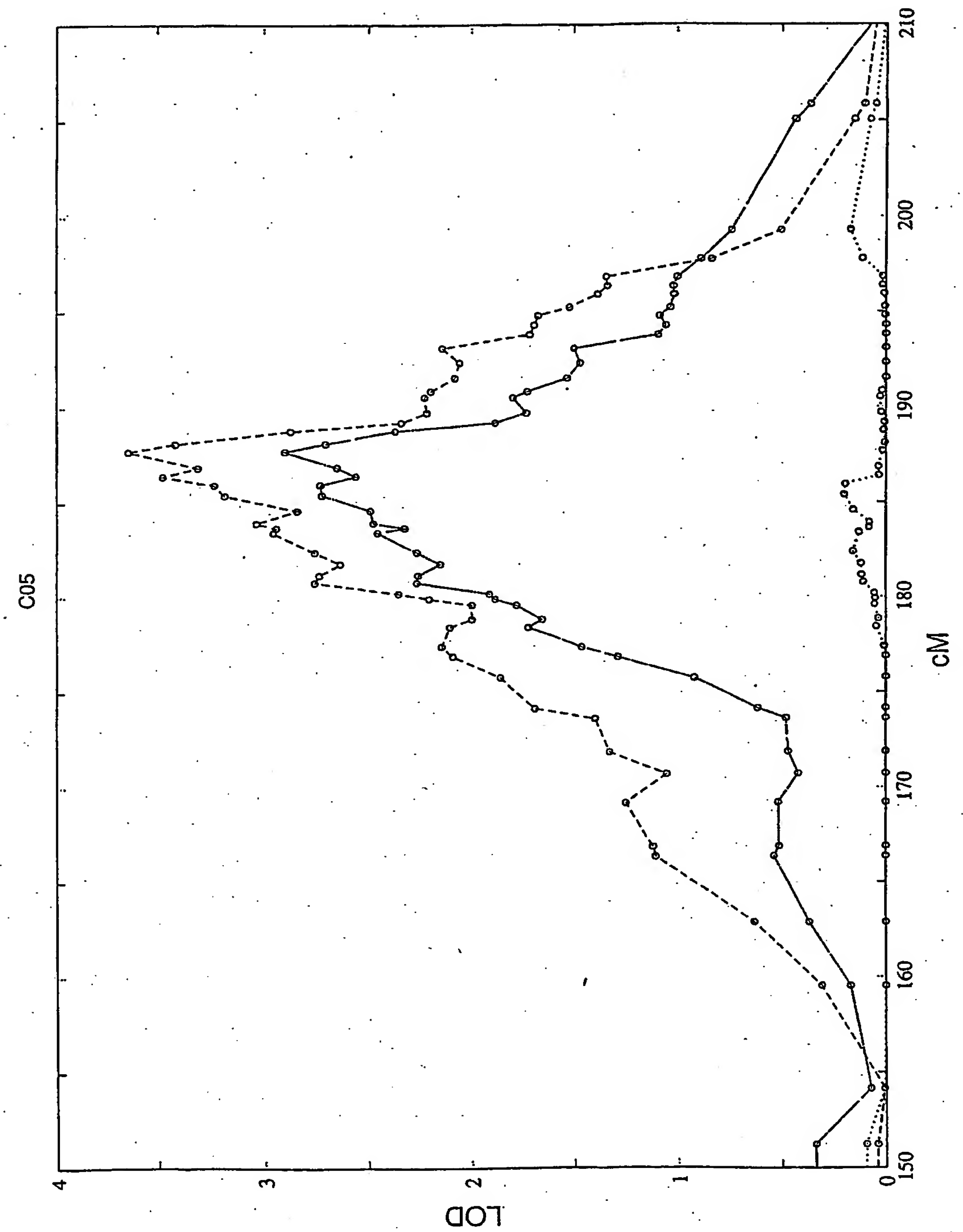

FIG. 5

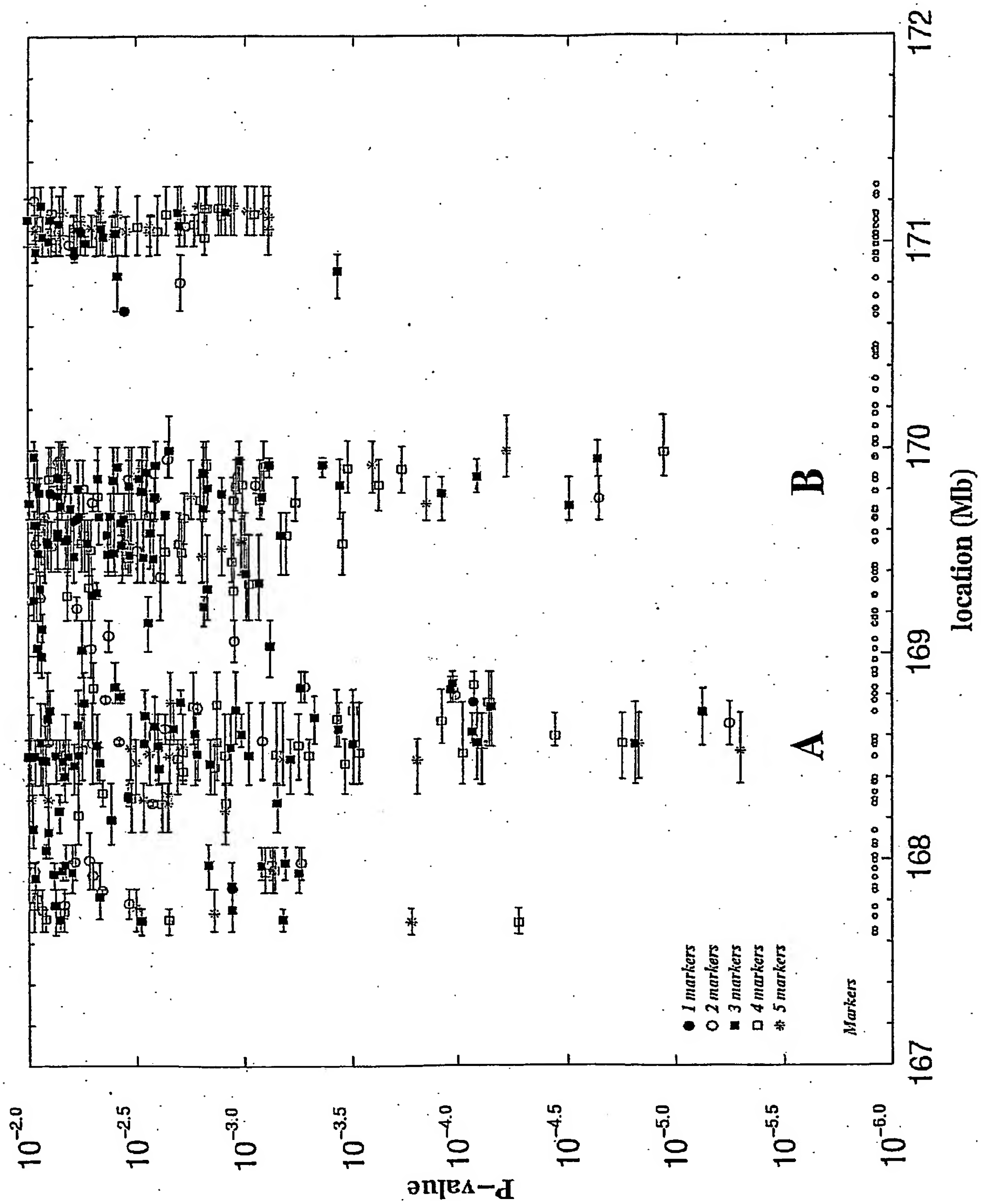
P−value
$10^{-2.0}$
$10^{-2.5}$
$10^{-3.0}$
$10^{-3.5}$
$10^{-4.0}$
$10^{-4.5}$
$10^{-5.0}$
$10^{-5.5}$
$10^{-6.0}$
location (Mb)
167
168
169
170
171
172
A
B
1 markers
2 markers
3 markers
4 markers
5 markers
Markers

FIG. 6

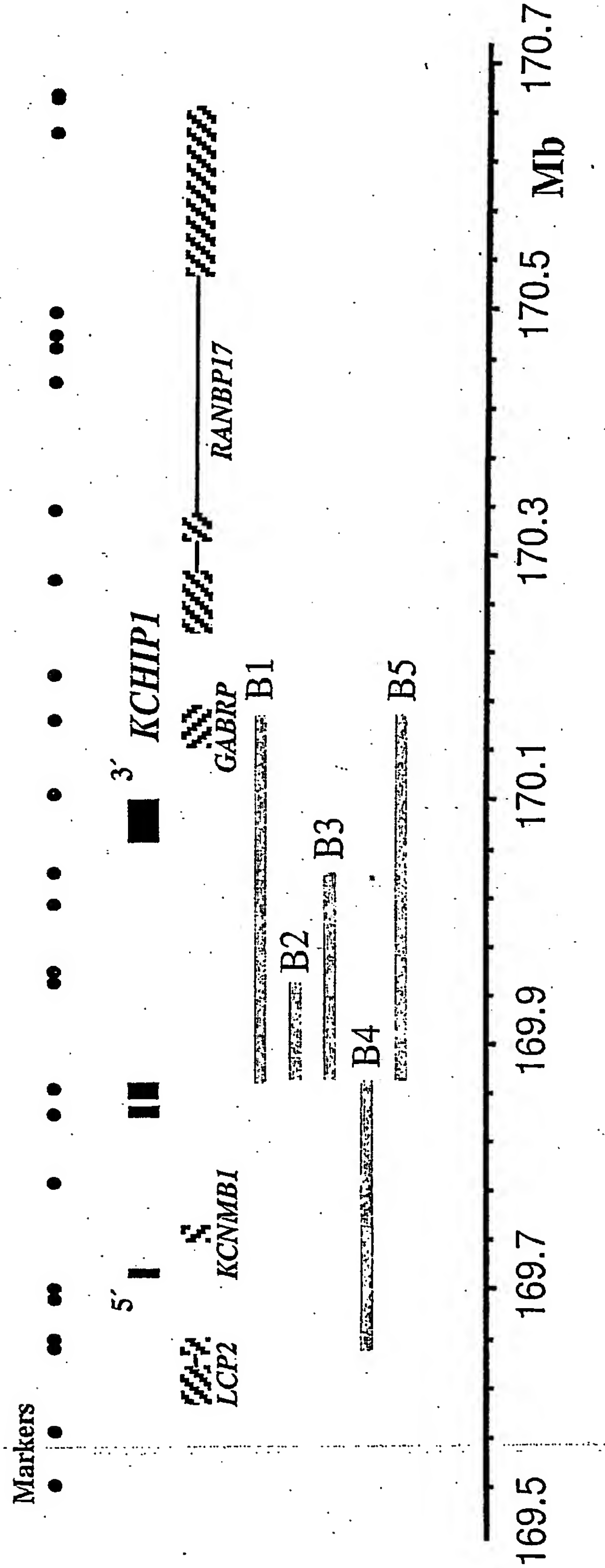
Markers
5′
3′
KCHIP1
LCP2
KCNMB1
GABRP
RANBP17
B1
B2
B3
B4
B5
169.5
169.7
169.9
170.1
170.3
170.5
170.7
Mb

FIG. 7

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
21 May 2004 (21.05.2004)

PCT

(10) International Publication Number
WO 2004/041193 A3

(51) International Patent Classification[7]: C07H 21/04, C12Q 1/70, C12P 19/34

(21) International Application Number: PCT/US2003/034681

(22) International Filing Date: 31 October 2003 (31.10.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/423,545	1 November 2002 (01.11.2002)	US
60/449,945	25 February 2003 (25.02.2003)	US
60/477,111	9 June 2003 (09.06.2003)	US

(71) Applicant (*for all designated States except US*): **DECODE GENETICS EHF.** [IS/IS]; Sturlugotu 8, IS-101 Reykjavik (IS).

(72) Inventors; and
(75) Inventors/Applicants (*for US only*): **REYNISDOTTIR, Inga** [IS/IS]; Gunnarsbraut 26 1R, IS-105 Reykjavik (IS). **GULCHER, Jeffrey, R.** [US/US]; 25663 Countryside, Lake Barrington, IL 60010 (US). **GRANT, Struan, F.** [GB/IS]; Sorlajkov 1, IS-107 Reykjavik (IS). **THORLEIFSSON, Gudmar** [IS/IS]; Vesturberg 10, IS-111 Reykjavik (IS).

(74) Agents: **CARROLL, Alice, O.** et al.; Hamilton, Brook, Smith & Reynolds, P.C., 530 Virginia Road, P.O. Box 9133, Concord, MA 01742-9133 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) Date of publication of the international search report: 6 October 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 2004/041193 A3

(54) Title: HUMAN TYPE II DIABETES GENE-Kv CHANNEL-INTERACTING PROTEIN (KChIP1) LOCATED ON CHROMOSOME 5

(57) Abstract: Association of Type II diabetes and a locus on chromosome 5 is disclosed. In particular, the gene KCh1P 1 within this locus is shown by linkage analysis to be a susceptibility gene for Type II diabetes. Pathway targeting for drug delivery and diagnosis applications in identifying those who have Type II diabetes or are at risk of developing Type II diabetes, in particular those that are non-obese are described.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US03/4681

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : C07H 21/04; C12Q 1/70;C12P 19/34
US CL : 435/6, 91.1; 536/23.4, 24.1
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 435/6, 91.1; 536/23.4, 24.1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
STN, East

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A, T	KROESE, M. Genetic Tests and Their Evaluation: Can We Answer the Key Questions? Genetics in Medicine. Nov/Dec 2004, vol. 6, pp475-480	
A, T	LUCENTINI, J. Gene Association Studies Typically Wrong. The Scientist; Dec. 2004, Vol. 18, page 20	1-3
A,T	PAGE G. P. Are We There Yet? Deciding When One Has Demonstrated Specific Genetic Causation in Complex Diseases and Quantitative Traits. Am. J. Hum. Genet., 2003, vol. 73, pp. 711-719	1-3
A	US 6,361,971 B1 (RHODES et al.) 26 March 2002 (26.03.2002)	1-3
Y, P	VAN HOORICK, D. Differential Modulation of Kv4 Kinetics by KChI P1 Splice Variants. Molecular and Cellular Neuroscience, 2003, vol. 24, pp. 357-66.	1-3
Y, P	REYNISDOTTIR, I. Localization of a Susceptibility Gene for Type 2 Diabetes to Chromosome 5q34-q35.2 Am. J. Hum. Gen. 2003 vol. 73, pages 323-335	1-3
A, P	MARTIN L.J. A Quantitative Trait Locus Influencing Type 2 Diabetes Susceptibility Maps to a Region on 5q in an Extended French Family. Diabetes, Dec. 2002, vol. 51, pages 3568-	1-3
A	LINDGREN C.M. Contribution of Known and Unknown Susceptibility Genes to Early-Onset Diabetes in Scandinavia. Diabetes, May 2002, vol. 51, pages 1609-1617	1-3

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"B" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21 March 2005 (21.03.2005)	11 AUG 2005

Name and mailing address of the ISA/US	Authorized officer
Mail Stop PCT, Attn: ISA/US Commissioner of Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Sarae Bausch Telephone No. (571) 272-0460 JULIET C. SWITZER PRIMARY EXAMINER for

Form PCT/ISA/210 (second sheet) (July 1998)

PCT/US03/34681

INTERNATIONAL SEARCH REPORT

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A, T	PEZZOLESI M.G. Examination of Candidate Chromosomal Regions for Type 2 Diabetes Reveals a Susceptibility Locus on Human Chromosome 8p23.1	1-3
A	TAKIMOTO K. Palmitoylation of KChIP Splicing Variants Is Required for Efficient Cell Surface Expression of Kv4.3 Channels. J. Biol. Chemistry, July 2002, Vol. 277, pp. 26904-26911	1-3
A	AN, W.F. Modulation of A-type Potassium Channels by a Family of Calcuim Sensors. Nautre, 3 February 2000, Vol. 403, pages 553-556	1-3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US03/34681

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claim Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.: 1-3, species SG05S96, DG00AAJIB, DG00AAJHF

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

Group 1, claims 1-3 a method of diagnosing susceptibility to Type II diabetes by detecting polymorphism in KchIP1.

Group 2, claims 4-5, a nucleic acid molecule comprising KChIP1.

Group 3, claim 6, a method for assaying for presence of nucleic acid molecule in a sample.

Group 4, claims 7-8, a vector and host cell comprising a nucleic acid molecule.

Group 5, claim 9, a method of producing a polypeptide.

Group 6, claim 10, a method of assaying for a polypeptide.

Group 7, claims 11, 13-14, a method of identifying an agent that alters expression of KChIP1 nucleic acid.

Group 8, claims 12, 15-16, an agent that alters expression of KChIP1 nucleic acid.

Group 9, claim 17, a method of altering expression of KChIP1.

Group 10, claim 18, a method of identifying a polypeptide that interacts with KChIP1 polypeptide.

Group 11, claims 19-22, a therapeutic agent.

Group 12, claims 23-25, a method of treating a disease associated with KChIP1.

Group 13, claim 26, a transgenic animal comprising KChIP1.

Group 14, claims 27-30, a method for assaying a sample for the presence of KChIP1.

Group 15, claims 31-35, a reagent for assaying a sample for KChIP1.

Group 16, claims 36-38, the use of a nucleic acid.

Group 17, claims 39-48, a method of diagnosing susceptibility of Type II diabetes by a haplotype of one or more markers.

Group 18, claims 49-51, the use of a therapeutic agent for treatment of Type II diabetes.

Further species election:

For group 1 and 17, the species are each SNP recited in Table 13.

For group 2-6, 14-16, the species are each sequence recited in Table 10.

For group 17, the species are each sequence recited in Table 2, 5, or 13.

The first named invention which will be searched is Group 1, species rs1895301, claims 1-3.

The inventions listed as Groups 1-18 do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the common technical features that joins all the inventions is gene KChIP1.

INTERNATIONAL SEARCH REPORT

An et al (Nature, vol 403, ppp.553-556) teach the KchIP1,2, and 3 cDNA, gene expression and protein localization (see 2nd column, 3rd paragraph, page 553 and 1st column, 1st paragraph, page 554). Thus, the technical feature linking the recited groups 1-2 does not constitute a special technical feature as defined by PCT Rule 13.2, as it does not define a contributation over the prior art. Thus, there is no special techncial feature that joins the methods.

The species listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, the species lack the same or corresponding special technical features for the following reasons: the species do not share a significant structural element and each element does not belong to a recognized class of chemical compounds (see AI Annex B, part 1(f)). Further, these are known special technical feature in view of the prior art.